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Original Contributions.

CHROMATICS.

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In the history of the porcelain inlay, the matter of color has ever been a discouraging factor. Time and again the most skilful have failed, and frequently those of little skill have made lucky accidents which, when cemented to place, were almost imperceptible. The failure of the skilled cannot be attributed to lack of effort, nor need the accidental success of the unskilled be due to thoughtless endeavor. The master of technique fails, and knows there is yet something for him to master. The other may blunder to accidental success, and, if not thoughtful, goes on his heedless way without a suspicion that he unwittingly correlated the laws governing the phenomena of color.

Each branch of learning is interdependent and the value of each or all depends wholly upon the influence they may have upon the surrounding association, and painstaking research by many scientific investigators has given, ready for our use, a vast knowledge of light and its attendant phenomena—color. Hence, attention is called to the new dress of an old acquaintance, namely, Chromatics, or the Science of Color, here applied to porcelain.

Prevalent notions on this important subject are vague; sometimes fanciful; at least empirical. We have from the beginning heard much of the so-called shadow problem, but, as yet, no one claims to have solved it. Neither has anyone, least of all the writer, claimed the mastery of color, which is the real problem. But there are facts and principles by which each may develop this subject, and by calling your attention to some of them and soliciting endeavor along given lines, certain and definite, we hope to

secure the further study and consideration of the subject, and add to the advance of dentistry.

First, light is the source of color. In this instance I speak of ordinary white light—daylight or sunlight (the best substitute of which is electric light)—which, when passed through a prism, gives us the prismatic spectrum wherein we find the colors of which white light is composed. Light is defined as "that force in nature, by the action of which upon the organs of sight, objects from which it proceeds are rendered visible." And it may aid the reader's understanding to explain its action briefly.

Light is conveyed through space by vibrations or undulations of an imponderable element, known to scientists as ether, and which is supposed to fill all space. These vibrations are inconceivably rapid, ranging from 35,000 to 68,000 vibrations per inch of space traveled, which, multiplied by the inches in 186,000 miles, the distance traveled per second, give some conception of the range and rapidity of the light vibrations beating across the retina of the eye, and giving to us the sensation of color. Therefore, color is a sensation, and is not a fixed and inherent quality of the object.

Color is a sensation, excited (usually) by light vibrations upon the retina of the eye, and has no objective existence apart from the seeing eye. Without the excitation of the retina of the eye by light vibrations, all is blackness, which is total absence of all color.

Six colors are revealed by the prism, viz., red, yellow and blue, known relative to pigments as primary colors, and orange, green and violet, known as secondary colors because they may be formed by the proper mixing of the primary colors. Primary colors cannot be formed from other colors.

These six colors are also known as the spectral colors, because having been produced in the spectrum, and here "scientifically color is a term used to distinguish those sensations which lights of various rates of vibration give to the eye." But from the artist's point of view, colors are produced by pigments, and differ from spectral colors in this, that they divide light by absorption and reflection, and not by decomposition as we find it in the spectrum. Hence, "ordinarily the word *color* is used to designate

those properties of a body by which it reflects to the eye the color or sensation described."

We find the sensation of color is ordinarily brought about by a division of the complex white light waves through the aid of selective absorption and selective reflection. In the prismatic spectrum the incident ray of white light is decomposed into its several parts or colors. Now, the pigments or colors of surrounding objects are endowed with certain properties and peculiarities, in this, that they stop, extinguish, so far as the eye can see, certain vibrations, and reflect others. The ones reflected to the eye produce a given sensation which we call blue, red, yellow, green, etc., as the case may be. The vibrations stopped are said to be absorbed, hence we have color by selective absorption and reflection.

Now, in passing from spectral colors to pigments, we must not forget that as to pigments there are only three primary colors, and that while the mixture of the colors of the prismatic spectrum produces white light, the mixture of the primary colors as pigments produces gray or black. This is due to the peculiar property of pigments, described above, known as selective absorption and selective reflection. To explain more fully, a pigment reflecting red has absorbed the blue and yellow vibrations; a pigment reflecting yellow has absorbed the red and blue vibrations; and a pigment reflecting blue has absorbed the red and yellow vibrations, which combined make up the white light. Consequently, it is only the pigment reflecting white that reflects equally the red, yellow and blue vibrations; a pigment appearing black reflects none of them, but absorbs all.

We have further to consider the fact that pigments are not pure as to color. Every blue pigment contains red or yellow; every red pigment contains blue or yellow; every yellow pigment contains either blue or red. And, as before said, the union of blue, red and yellow of the spectrum produces white, because the full force of the vibrations of the incident ray are again united; but the union of the blue, red and yellow pigments of equal intensity produces black, because each pigment absorbs, stops, the vibrations corresponding to the other colors.

Since it is by absorption and reflection that pigments divide

light and present color, it would, to the casual observer, appear that all the dentist need to do to secure desired results in coloring porcelain would be to paint on the pigments the same as is done by the artist painting a picture. But a little consideration will show that the two propositions are quite different, and in this, that the artist's pigments are opaque, while those of the dentist are necessarily semitranslucent, which permits a large amount of light to penetrate deeply into the body of the inlay and there to be absorbed or reflected according to the provision made.

If the reflection back through a semitranslucent pigment porcelain of correct hue be equal to that of the adjacent enamel, the inlay will be a fair match; but if the inner part of the inlay does not fairly reflect light, but rather absorbs it to a greater or less degree than does the adjoining tooth structure, it will appear either too bright or too somber in tone. Hence, it appears very clearly that the artist painter deals almost entirely with surface reflections, whereas the dentist to secure life-like effect has to control the reflection from within the depths of the porcelain as well as that from the surface.

It is easy to realize how a translucent colored body, having considerable internal reflection, will appear brighter than one having no internal reflection. Possibly the matter may be made clear by coming to it in a different way, and we will take a window pane of colored glass as an example. But first let us explain the reflection which will occur.

A ray of white light falling upon, let us say, red glass, will have a part reflected at the surface. This surface reflection will be of the same color as the incident ray. The remaining portion of the incident ray will pass through the glass to the farther surface, where reflection of another part will occur. This second reflection will give us the sensation of red. The remainder of the unabsorbed light will pass entirely through the glass and also appear red. The blue and yellow vibrations are extinguished.

Here we see that a body may transmit a color or it may reflect a color, or it may do both. The window pane, on the outside, appears red by reflected light; on the inside the transmitted light is red. The brightness of the light depends upon the extent or quantity of vibrations, and the appearance of the window would

be greatly brightened by reflecting the transmitted light back through the window to the eye on the outside. Carry this out by experiment with colored glass. A stained glass placed upon a black object is visible by general reflection, or a surface reflection, and it looks fairly white; but place some white paper between the stained glass and the black object, the white paper reflects all the transmitted rays of light, where the black absorbed all of them. The resultant change is marked and brilliant. The colors produced by transmission of light through translucent colored substances are much the most brilliant and lifelike of any we can produce.

This shows clearly that a body may both transmit and reflect colors; also that it is apparently brightened when the transmitted light is reflected by a second surface, as white paper. This is color due to absorption and seen by internal reflection. One part of the incident light is reflected unchanged at the surface, the diluted remainder penetrates deeper to be irregularly absorbed or reflected back to the eye. Hence, any background other than white will reflect unequally, and may harmfully modify the color desired, for white harmonizes in conjunction and opposition with all other colors and gives the maximum amount of reflection. If white paper is taken at 100 in luminosity, we find chrome yellow is 75, emerald green 48 and vermilion 25. Consequently if we would brighten the object by reflecting the transmitted light, we will get the best results by using white internally, as it reflects all colors equally.

Usually the appearing failure of an inlay may be due to the lack of proper internal luminosity or reflection, to improper coloring, or to light wave interference, or to all three causes. In either case, the first and usually the most needed correction is to control the internal reflection of the inlay, and this is accomplished by the wise choice and arrangement of the foundation bodies. Therefore, we will dismiss the causes of failure for the present, taking them up again in proper order after describing, with reasons, what the writer deems to be the least objectionable method of choosing and placing foundation bodies for the control of reflection and color.

The careful examination of a natural tooth shows that the

enamel is nearly translucent and that the dentin is nearly opaque with an exceedingly fine granular surface.*

Now, such a surface has, owing to its peculiar formation, the property of constantly reflecting light with more certainty and in much greater quantity from all angles of incidence than would be the case were the surface plane. Plane surfaces, like water, ice and glass, with the angle of incidence perpendicular, reflect but 18 to 20 rays out of a thousand, whereas when the angle of incidence is oblique, the reflection increases proportionately to 88 or 89 degrees, where nearly 800 rays out of a thousand are reflected.

This fact is beautifully illustrated by a comparison between ice and snow. The ice, having a single plane surface, permits light with perpendicular incidence to enter quite freely and be absorbed, whereas the snow, because of its infinite multitude of reflecting surfaces, returns to the eye at all angles of incidence by far the greater quantity of incident light. Therefore, to secure at varying angles of incidence a constant maximum internal reflection from an inlay, it is necessary to have a granular white surface beneath the enamel colors. It is true, such high reflecting power is not always, possibly seldom, required, but to understand the use of such power is none the less a necessity, for comprehension of the maximum enables modification toward the minimum, and a foundation body, fusing at a higher degree than the subsequent enamel colors, enables us to secure and retain the desired granular surface formation in all its effectiveness.

You will understand this desired granular formation somewhat clearly by taking a small square of glass, and finely grinding one-half of its surface. The whole surface of the ground half will appear equally bright at different angles, whereas the bright spot or image of source of light on the plane half will but change position as the glass is moved from angle to angle, the remainder of the polished surface appearing greatly dimmed.

The human eye is so constructed that when light comes to it in a great multitude of reflections, closely associated, as from the

*Dr. C. N. Thompson, in *Cosmos*, May, '07, brings out very clearly the necessity of considering the formation of a natural tooth in this matter.

ground glass, the blur of light upon the retina is sufficient to destroy the definition of the retinal image of the source of the incident light. An opposite effect is true when light is reflected to the eye from a polished surface, as shown above, wherein we may distinguish at one point only the image of the source of light.

Now, surfaces having innumerable points of reflection, as snow, crushed salt, finely ground glass, white paper, etc., do not absorb or extinguish light vibrations to an appreciable extent, and, consequently, do not present colors other than that of the incident ray falling upon them; as an example, if the incident ray be red, blue or yellow, the snow, crushed salt or ground glass will appear red, blue or yellow by having only red, blue or yellow rays of light reflected to the eye, and such irregular surfaces, owing to their constant reflective power, can be made very useful in porcelain work by using and confining them to the foundation body upon which is placed the proper enamel color.

One of the laws of light is: That light, in passing from one medium to another, is reflected in proportion as their refractive index varies. This law insures some degree of reflection where foundation bodies are used, regardless of whether the foundation body be the best reflective color or not, for the difference of fusing points between the foundation body and enamel colors shows difference in composition and character enough to give a varying refractive index and cause some reflection.

We will now pass to improper coloring, and it may be beneficial to quote briefly from Field's Grammar of Coloring, as follows:

"The elements or natural powers by which colors are produced are the positive and negative principles of *light* and *darkness,* and these in paintings are represented by white and black, which are thence elementary colors; between the extremes of which exists an infinite gradation of shades or mixtures which are called grays. affording a scale of neutral colors.

"As by the deflection of a *point in space* may be generated all the elementary and complex figures and forms of geometrical and constructive science, so from a like deflection of a *spot in place* may be generated all the elementary and compound hues and colors; the science of which is called *chromatics.*

"Thus a spot of any shade or color on a ground or medium

lighter or darker than itself, being viewed by a Lensic Prism, will be deflected by the ordinary refraction of light and shade into an orb of three colors. These three colors are the known blue, red and yellow, which, as they are incapable of being produced by composition, and also of being resolved into other colors by analysis, are simple, original and *primary* colors. Accordingly, if the ground and spot be varied from light to dark, or from black to white, the same process will afford the same three colors, differing only in the inversion of their arrangement.

"In the experimental evolutions of transient colors from light and darkness, a polar influence determines the blue color and its allies, toward black or darkness as the negative pole, and yellow followed by red and their allies, toward the positive pole of light or white, and this is a constant law of chromatism, by which all the relations of colors are determined, as well in respect to vision and the requirements and colorific powers. And it coincides also with the electrical affinities by which colors are determined chemically according to an undoubted universal law.

"Colors may be classed under three heads—primary, secondary and tertiary. Any two of the primaries mixed in proper proportion produce a perfect secondary color, which harmonizes with the remaining primary. Thus blue and yellow form green, which harmonizes with red; yellow and red produce orange, which harmonizes with blue; red and blue form purple, which harmonizes with yellow.

"Finally in a like manner, by the alternate compounding or mixing of these secondary colors in pairs is produced a third order of colors, thence called *tertiary colors.* Thus if green be mixed with orange color they will form a citrine or citron-color; if orange be mixed with purple they form russet; and if purple be mixed with green they form olive color, and these new denominations of colors, *citrine, russet* and *olive, constitute the third order* of *colors,* each of which is variously compounded from the three original or primary colors, as the second order is of two, the primary order being single and uncompounded; and, lastly, by duly mixing or compounding either of the three orders of colors, *black will be produced,* terminating the series in neutrality of color.

"The primary colors themselves may, however, be materially altered by admixture; thus, by mixing them in various proportions,

all *hues* of colors are produced. These hues being diluted with white form *tints,* or by being toned with black give the different shades of color."

It is best to place the desired enamel color in one layer upon the foundation body. It is a law in transmitting light, that the light is extinguished or absorbed in proportion to the square of the thickness of the transmitting medium; in which case a too thick or too thin layer of enamel color, though it be the correct color, will greatly modify the brightness of the color of the finished porcelain.

The proper enamel color to use is for the eye to see and determine, and its thickness is wholly a matter of judgment and experience; the above law shows which way to modify tone, not color. Supposing, now, that we are reproducing a part of a tooth which has an orange-colored neck with a greenish tip. There is red and yellow in the orange, yellow and blue in the green. The yellow in each color, by a reciprocal action or interference, partly destroys the other. The orange appears more red, and the green appears more blue than we intended it should when placing the colors. Very much the same effect may be secured by placing a layer of one compound color over the other, except this, that all colors used by us are more or less broken or compound colors, and should all three primary colors be common in the two layers, we will secure a per cent. of complete absorption or blackness equal to the common per cent. and intensity of the three primaries in the two layers, which thereby results in a shadow unexpected and undesired. This cannot wholly be overcome except by experience, but much may be accomplished toward right choice of color by knowledge of composition of each hue and tone that we use, and I believe that it is not at all necessary, in fact, is not practical, to have a large number of broken colors. The nearer we can keep to the simple tones and hues, the more apt we will become in the placing of them to secure desired effect.

Knowledge of composition of hues is quite essential. As an instance of inaccuracy, we are accustomed to speak of the gingival portion of a tooth as being yellow, whereas should we place it by chrome yellow, as a standard, we should find that portion of the tooth more nearly orange or even brown; and any sixth-grade school girl will tell us that those two colors are largely composed

of red, hence it would seem that we need to consider composition of hue in choosing our colors.

Interference: By likening light vibrations to waves, you will readily understand the position designated by crest and trough of the waves. Now, to explain, let us suppose we are viewing an advance of innumerable waves upon the water, with alternate crest and trough, and, as we watch, some unsuspected agency starts up another set of waves, one-half wave length behind the first set, so that the crest of one set and the trough of another are simultaneous, and thus each set of waves, by interference with the motion of water by the other, levels the water, and it appears calm. Again, as we watch, the unsuspected agency so changes the second set of waves that they superimpose or ride the crest of the first set, thereby augmenting and increasing their size and height. Now, light vibrations may interfere with each other in a similar manner, which explains why proximal gold fillings frequently appear black or very bright. The light vibration reflected from one is interfered with and neutralized by the vibrations reflected from the other, with the resultant calm and apparent darkness. If, from change in relative position with the eye, one wave superimposes the other, as crest simultaneous with the crest, the objective fillings will appear much brighter than normal, for then one light wave augments the other. Also this understanding of light wave motion doubtlessly explains one reason why many inlays appear too light or too dark by artificial light, for as our most used artificial lights are yellow in tone, it is easily understood that the surface reflection of the yellow light and the internal reflection from a yellow body may interfere with and neutralize or augment each other, according as the distance between reflecting surfaces, plus the angle of reflection to the eye, is in multiple with the length of wave motion.

Such interference is impossible when reflection comes from a foundation body having a fine granular surface, for the irregularities of such a surface give an immense multitude of reflections in irregular order, thereby preventing any large portion of them ever happening in multiple with the length of wave motion. The above-mentioned interference is impossible in sunlight, owing to the great diameter of the sun, which, in comparison with artificial light,

gives points of incidence so innumerable that the light converging from thence to the reflecting surface has such a great number of angles of incidence and reflection that all interference is overcome.

Therefore, as we cannot always view inlays by sunlight, it is necessary to make the internal reflective surface of a character having the innumerable points of reflection, as mentioned above, thereby simulating nature. Consider for a moment that the pigmentation of the natural tooth occurs just at the inner ends of the enamel rods. The enamel rods are largely crystalline, and by arrangement, end on, semitranslucent. The surface of the dentin is finely granular and highly reflective. Then, I am sure, we realize the reasonableness of attempting in porcelain work to control light and its attendant phenomenon, color, by forming our porcelain bodies, as nearly as their character will permit, into formations similar to the natural live tooth.

Cements: It is the belief of the writer, founded upon successful results, that most all inlays should have white foundation body first over the matrix in order to obviate all absorption by the cement, for it is an evident fact that if the light be controlled before reaching the cement, the troublesome shading, frequently caused by the cement absorbing the light, is eliminated. A shade thus formed is the result of light absorption. It indicates that some part of the incident ray has been subtracted, extinguished, and only the diluted remainder returned to the eye. Shade in relation to light occupies the same position that the vacuum does to air. Eliminate the excessive internal absorption by increasing the internal reflection, and you overcome the darkening effect caused by the cement.

It has been found by careful analysis that the enamel of the tooth is nearly five per cent. organic. This organic matter is mostly in the form of prismatic fibers or sheaths acting as a bond between the enamel rods. Now, owing to the physical difference between the enamel rods and the organic matter cementing them together, it is evident that the two substances have a varying refractive index, causing reflection at the points of union sufficient to prevent, in large measure, the passage of light through the enamel at right angles to the long axis of the rods. Consequently light passing through the enamel to the pigmentation at

the inner ends of the rods travels by reflection down the rods as down a tube, to be reflected back by the granular surface dentin to the outer end of the oblique enamel rods, which radiate from the long axis of the tooth and in more or less degree obliquely toward the outer end; this arrangement plus the elliptical surface of the tooth presents for the dispersion of the reflected light a more or less perfect polygonal lens which, in a measure, may be compared to a combination Luxfer prisms.

This conception of the control of light by the rods is important in cavity formation and subsequent cementation in this, that when cavity walls follow and coincide with the line of enamel-rod radiation it permits the formation and insertion of the inlay as an integral rod of larger size, also because of the small diameter of the tooth in comparison with the circle extending from the same center to the eye, the diverging rods will, in most cases, cover the cement from the direct line of vision to that part of the tooth. If the cavity wall be at or near the median line of the tooth, parallel with the line of vision, the covering effect is not secured and we have to rely upon the cement to obliterate itself. This is accomplished by using light-colored cements, say light pearl gray where the enamel is thickest and light yellow toward the cervix. Being light colored and finely granular the cements reflect such colors as are incident to them, and after crystallization, when submerged in absorbed moisture, harmonize very closely with adjacent colors of the tooth and inlay. If the cavity wall be parallel to the line of vision, yet oblique to the radiating rods, as in cavity formation for cohesive gold, the cement line will be visible in proportion as the incident ray is in obliquity with the beveled enamel rods, the proportions of absorption and reflection applicable being those mentioned in comparing the reflection of ice and snow.

OBSERVATIONS AND EXPERIENCE IN THE PRACTICAL USE OF SILICATE CEMENTS.

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Silicate cements have only in recent years come into any kind of satisfactory use as a filling material in dentistry, and hence they have not had any prolonged practical tests of their value in the way of permanency and other requirements of a filling material.

Some of the first that were made in this country, or were introduced from Europe, did not seem to meet the wants of the dentists here, or were evidently faulty in their makeup and soon disappeared from the market. And yet they seem to have stimulated, on the part of others here and abroad, efforts to produce a more perfect combination of ingredients—something of real merit if not the ideal plastic filling material. At the present time we have several enamels or silicate cements that are creditable and meritorious products. Some that came from abroad have stood the tests in practice for from ten to twelve years in European countries, and from three to five in the United States; and they seemingly have grown so in favor that very many are now making daily use of enamel material of one or several makes.

Several makers of dental cements in this country have recently turned their attention to silicate cements and have put them out under proprietary names, such as Translux, made by Caulk, and Beryllite, made by Ames. They seem to work up and manipulate very much like Ascher's Enamel (German), and probably the constituent parts are very much the same. Of course, Ascher's has had a time test in use that the home products have not, but as far as one can observe in working them they are about the same.

The advantages that seem to lie in the silicate cements over zinc oxychlorid and oxyphosphate fillings are, first, translucency, or rather, I should say, semitranslucency—certainly a very desirable feature; and then density and hardness, together with properties (if mix and manipulation are not faulty) that resists the dissolving tendency of oral secretion. I have under observation a considerable number of these fillings that have been in service from several months to about three years, that have shown no noticeable sign of disintegration, and some that have been subjected to stress of mastication, together with the action of saliva; and it is agreeably surprising to note how little of wear or waste has taken place. I think we will find that, like oxyphosphate cements, they will wear better in some mouths than others.

As a preservative filling, I believe these silicate, or so-called enamel fillings, are unquestioned; for they, if properly handled, seal the cavity and are practically impervious. Where margins of the cavity are properly covered and burnishing is properly done

the joining of enamel to tooth structure cannot be detected, except where disclosed by a difference in shade. Unfortunately, a perfect shade at the time of filling will show a little variation in 24 hours; but there is no perceptible joint or crack between tooth and the material, as we so frequently see with even well-matched porcelain inlays.

We all know the peculiarities of oxyphosphate cements, and the difficulties of mixing with exactness for the very best results; also conditions of temperature and humidity; and again of manipulating while semifluid or soft, and letting alone when crystallization has reached a certain point, which we learn by experience. We will find much the same peculiarities with the silicate cements and some peculiarities of this material all its own. The liquid used in both classes of cements is practically the same, with only the variations that go to make quick setting or slow setting conditions. Cement powders cut some figure as to the rapid or slow setting. The finer the powder used the slower will be the setting, other things being equal. The darker powders will usually make stronger cements than the lighter ones.

Some of the oxyphosphate cements are called hydraulic—hardening under water—but I believe most of them will set better if kept free from moisture as long as possible. Certainly there is no so-called hydraulic property in the silicate cements; for if your filling gets moist before it is properly hard, you will have one that will disintegrate in a short time. I take all the time I consistently can to let these fillings harden before moisture comes in contact, and coat them with a very thin volatile varnish before removing the dam. I wish to emphasize this for the reason that it quickly flows all over the work as desired, penetrates all inequalities of surface, and quickly hardens into a good protecting skin that clings. A thicker varnish dries down to a tacky consistency and remains tacky for too long a time. It does not penetrate the microscopic pits as does the thin, hence is a film more easily dislodged when the dam is removed, and affording less protection than a very thin film that hardens almost instantly and sticks for some time. I use Dr. Hewett's succinate cavity lining, copal-ether varnish or thin collodion; and I frequently use this same varnish to line a cavity before inserting the enamel.

handling it with care not to let it flow over margins. I have found some of my deep-seated enamel fillings are irritating to the pulps for some time after insertion, unless some sort of protection is first employed. The cavity lining is good; but if the cavity goes close to the pulp, an intermediary substance—a poor conductor of thermal changes—is placed first after the varnish. Oxyphosphate cement may be used to partly fill up a cavity, keeping away from margins, following immediately or not, as one may wish, with the silicate cement; but if cement gets hard retention must be made for the enamel. The cavity must always be made as retentive as for a metallic filling; about as would be done for amalgam. The enamel cement is very sticky at first, but if put into a saucer-shaped cavity it will, after a time in the mouth, drop out.

The silicate filling material should be mixed very much like oxyphosphate cements, drawing in but a little powder and mixing well with all the liquid before adding more. Each addition, a little at a time, should be thoroughly incorporated before adding more.

When the material is ready for insertion it should be pretty stiff, but plastic enough to be readily forced, without much effort, to all inequalities of the cavity. As the substance at this point begins to harden rapidly, the shaping, molding and trimming must be done rapidly; and it is a mistake to try to fill and manipulate the material in three or more cavities—often more than one. Two approximating cavities can sometimes be handled well, depending somewhat on conditions. After experience and familiarity with the working of the material, and under favorable circumstances, four proximal fillings may perhaps be well done from one mix. The peculiar working of this silicate cement demands a good deal of the proper kind of attention until it is entirely hard. It therefore is not a substance for hasty work, as a rule, and the least moisture is ruinous until a certain degree of crystallization It, therefore, is not a substance for hasty work, as a rule, and the cements that we purposely wet or allow saliva to cover very soon after insertion.

Owing to this feature, it is difficult sometimes, as with gold, to use it in gingival cavities that extend beyond the edge of the gum.

But these gingival cavities after all, if they can be kept dry, are where I get some of the best results. So satisfactory is it that I now prefer it and try to use it in a large proportion of those girdling sort of cavities so often found following the curve of the gum margins half way or more around the teeth, especially the anterior teeth, including bicuspids and sometimes molars. So often, as every operator knows, these gingival defects are a mere line. I find I can excavate the least to prepare them for the enamel filling of anything I can use. Of course, decay and defective enamel must be cut away for any sort of filling, but for the enamel I can cut them narrower and shallower than for anything else suitable to fill with at all. Of course, they would hold amalgam nicely; but amalgam is out of the question in anterior teeth. I first remove the defective tissue, often very shallow, leaving margins square. With a small cone or wheel bur I undercut the entire length of channel. The usual yellow color of the necks of teeth are pretty easily matched with the variety of shades supplied in the enamel powder, and if there is a little shade variation, perhaps, the enamel looks, when finished, better by far than anything else, with the exception, possibly, of a perfectly fitted and shaded porcelain inlay—but not excepting the average inlay. In these gingival cavities the filling is not subject to stress of mastication or other wear except that of the tooth brush, and so far as I have gone, some three years, I find them without evidence of giving way.

As is common with this class of cavities, they have in some instances shown extension of decay at the ends, but that is simply evidence that extension for prevention was not carried far enough, and is no fault of the material. To my mind, if we could find no other place for these enamel fillings, they are an important, trustworthy substance for this class of work, even if they should have to be renewed from time to time, which, however, from the indications, I have no reason to expect. I consider them as permanent as anything we can use in this class of cavities. In fact, I consider good enamel fillings in many other locations in the mouth as permanent as at least an average filling of any other material—excepting, perhaps, cast gold inlay work, the average of which should be very high.

I will say, too, that my experience is that patients are highly

appreciative of this artificial enamel. It is not altogether ideal, but approaches it nearer than any other filling material up to date, viewing it from all points.

Suppose it does become somewhat concave where heavy wear is brought to bear it is still against the wall and protects and prevents. If its renewal is required after several years of service, is not the same true of the average filling of most other materials?

I have been able in many instances to serve myself better in the use of napkins or cotton rolls to keep these gingival cavities dry than I could with rubber dam, and I exclude the rubber dam wherever consistent, in consideration of the comfort of my patients. With the rolls adjusted, and held by a suitable clamp, if need be, I dry the cavity and touch over the overlapping gum with a saturated solution of zinc chlorid. This is just escharotic enough to sear the mucous membrane a bit, with the result that the surface of that gum becomes and remains as dry as parchment; unless the gum has been needlessly disturbed and caused to bleed, there will be no exudation of mucus or moisture about that cavity, provided the rolls or napkins are doing their duty in keeping the area of operation free from saliva. If in cleaning the cavity the gum has been wounded and bleeds, it only means the application of more zinc chlorid usually to stop it, using first a drop or two of dioxogen, perhaps, which cleanses the pit and causes the little blood vessels to contract and check the blood flow. The zinc chlorid then applied slightly sears the wound. The cavity in the tooth may then be quickly filled, burnished, trimmed and varnished, and another tooth taken up. I have frequently followed the same method of excluding moisture long enough to put a small gold filling in an under-the-gum, gingival cavity, but it is difficult on lower teeth to do that, while one of enamel may be put in, polished, etc., and coated with varnish before moisture gets to it.

If enamel is mixed too stiff it will not pack with certainty of being in good contact with the walls, and the several portions into which it becomes divided will not unite homogeneously, but while yielding under considerable pressure will, when finished, have a crackled appearance, and will soon disintegrate. It is better, then, to remove it all and begin over again. Occasionally, with all care, some pit or defect will develop in finishing. In such cases mix a little fresh material and use it after first drilling in

sufficiently for anchorage. Never try to use the former mix, as it will not hold. The additions show, and if it is a portion exposed to view, as in an incisor, all of the exposed surface should be removed, leaving a retentive pit to insure the hold of the new, as it will not become part of what has become hard in the tooth.

It is my custom under some circumstances to leave the fine finishing until the next day. It may then be disked and stripped as one would do with gold, polishing in the end with silex-flour and vaseline.

For some reason silicate cements seem to bleach somewhat in 24 hours, and I have found it better to use a darker shade than indicated at first to match up the tooth, with a certainty that this slight bleaching will lighten it up. Only practice and experience will teach the way to get best results in the scheme of selection and combining to get proper shade effects.

THE NECESSITY OF A MEDICAL EDUCATION FOR DENTISTS

BY V. A. LATHAM, D.D.S., M.D., F.R.M.S., CHICAGO, ILL. READ BEFORE THE SECTION ON STOMATOLOGY OF THE AMERICAN MEDICAL ASSOCIATION, JUNE, 1907.

"There is no place in the modern world for the unskilled; no one can hope for any genuine success who fails to give himself the most complete special education. Good intentions go for nothing and industry is thrown away if one cannot infuse a high degree of skill into his work. The man of medium skill depends upon fortunate conditions for success; he cannot command it, nor can he keep it. The trained man has all the advantages on his side; the untrained man invites all the tragic possibilities of failure."—*Hamilton W. Mabie.*

The subject assigned to me is one of such importance in view of the great advances made in the scientific professions as to need thorough discussion. The pros and cons have, we all know, been argued from time immemorial, so that it is with many misgivings the subject is once again reviewed. If I may recall the subject of my address when, as chairman of this section (1) as well as on previous occasions, it will be remembered that I have always

advocated the desirability of a closer union of the medical and dental professions; an increased sympathy in each other's aims; a better education of both along the lines of stomatology, dental pathology and therapeutics and a far better course in preventive medicine or hygiene. So far as the medical profession is concerned, the question is not one of personal treatment, but rather of early recognition of the significance of dental disease in its relation to the general health. The specialist, in both instances, should recognize the necessity of constitutional treatment in conjunction with his local measures, and be enabled to prescribe intelligently (5, 8, 24).

The question of the desirability of taking a medical qualification in addition to that essential for dentistry has long exercised the mind of the profession without being brought to a definite issue as to its wisdom; perhaps the evidence of the few adherents to its cause is regarded as a sufficient proof of its condemnation. The advantage in such a step is certainly fast increasing, though we can still note a difference of opinion with which schools, by their calendars, regard its importance; more discussion may clear the way for a definite line of action, and serve as a guidance for teachers in advising students (4, 27, 28). In and above all, let us feel an independence—the honorable heritage of a liberal profession and a generous education. Let it be understood, I intend no reflection on a singly qualified man, for we all know it is *not* the degrees that make the professional man, neither is it the ancient and proud university that will fit him better for his work than the smaller and newer school. It is the man himself—together with his environment, his preliminary education, his teachers and especially home influence through which he has been shown how to train his will, energy and time spent in regular hours of study with some overseeing hand, and I can only wish the preliminary school work was better arranged to develop the student as a thinker rather than as a mere receiver of facts and storing them in corners from which they disappear only too readily. After carefully watching the students who come into our colleges to pursue a professional or scientific course, one cannot help but notice many conditions under which they are unhappily placed (9). Is it their fault? Not altogether. It is the fault of

the school system formulated to give little of everything and much of nothing. Some condemn the country schools, as they are supposed to be lower in grade than those of some of our big cities. Experience teaches us that the general principles of education are better planted and growing in what they have, than those who have had a wider course of what seem useless subjects when we consider the varied walks of life from which the children come, the hard struggles to maintain them in a common school. Only recently in speaking to some men who are prominent teachers in business colleges, I was told of the great need in teaching the youth the common everyday subjects—namely, spelling, writing, reading and grammar, to say nothing of how to think and maintain concentration through the subject. This is where the education must be started, and in view of the following difficulties how can we overcome it (25)? Briefly let us point out some suggestions: (a) Home influence and supervision, needed by the child to teach regularity of living, reasons of hygiene and education; for overseeing a proper hour or more of home study is vitally necessary to form a habit in after years. Education has been blamed very severely lately, possibly more in the case of girls than boys, for in the former evil effects are more readily seen through the possibility of the lack of similar freedom from restraint and play hours in the open.

Daily experience among the school workers of all ages and conditions shows that in few if any cases should the schooling be blamed so much as the methods in the schools in lower grades of both day and night schools of unnecessary and questionably vital subjects, as the beadwork, raffia, carving, so-called school fads. Again, to-day, it looks as if the teacher is chosen who can systematize and crowd the subjects in small concentrated doses and force them into the children as a mass of facts with little or no discussion. This must result in a loss in the benefit of training the essential organs to encourage individual thought, quick and broad reasoning, the value of which can never be denied for all men, whether in commercial, scholastic or professional life (3, 17). Again, parents are to blame in the home, and I am certain few realize how much damage is done to school children by allowing late hours and, worse, the irregularity of these living and study

hours, as well as the great amount of play or visiting, which acts so injuriously on the nervous and digestive systems by the amount of energy used in the hurry and scurry consequent to making fourteen hours do for every twelve. The present inclination for fashions in matters of hygiene, so wrongly termed physical culture, can lead to great extremes. Witness the care of children in some families known to the writer, who habitually go to school on the train, several miles away, without breakfast, and who spend their stray pennies for candy or consume "fudge" by the pound, when wholesome food would do them far more good. The unstable nervous equilibrium of these children excites pity as well as amazement by their restlessness, impatience, irritability, insomnia, lack of appetite, precocity, lack of endurance and resistance, profound anemic conditions, with all their sequelæ. These taken with the maldevelopment in so many cases of the superior maxillæ, irregularity of the jaws, adenoids and contracted and deformed vaults and nasal cavities cannot but hasten caries of the teeth from as many causes, and the far-reaching effects are hardly credited when explained to the parents, who should be aided by the hearty cooperation of the family physician and dentist (3, 5). Instead of blaming education for these evils, let us be honest and rather lay the blame on the kind of education which does not teach thoroughly or carefully, and especially broadly, the foundations of vital subjects suited for all classes of children who come to the grammar schools, yes, and even as far as to the third year in high schools. The distractions of society, fraternal and sporting pastimes entering into school life, should be most severely condemned when carried to the extremes of today. When a lad or girl is ostracized because they are not members of a certain society or clique and their school hours interfered with by such by-play—with no teaching of obedience, respect or reverence for those in authority, as they know very well in many schools punishment cannot be given—is it any wonder we have students dictating to their faculties as to what they think best for them to study? These, and I regret to say they are the majority, injure the work and chances of many would-be hard-working students and interfere in many cases with a students stopping school in his fourteenth to sixteenth year, just when he enters business or

professional life, and can we wonder he is not prepared for study and reading, which requires close application and concentration, something of which he has never dreamed (2,30).

In some things, I am coming to believe it would be better to stop coeducation in high schools in view of the present lack of home influence and training, for the age of puberty is given to much and many variations where careful reasoning and skilful guidance in learning self-control and moral support could be better done without mixing sexes. Competition, so good for all to stimulate ambition, further research and criticism, could still be had by the rival schools, and on graduating, when the students were more matured and reasoning, the university coeducation could be resumed, for by then both would be considering their life studies and have reached years of discretion. Another thought worthy to consider is, the more thorough weeding out of non-eligibles by reason of business, other occupations outside of college work and inability to study should be more thoroughly done and so make better chances for those who pay their fees under great hardship and could get what is their right in fitting them for their future profession. The retaining of considerable students has done much harm in taking a teacher's attention or his assistant's time as well as crowding the classroom and encouraging poor students to the detriment of good who are straining every effort at great sacrifice to earn their college degree and standing.

The recent tirades by a prominent New York physician[1] would relegate "girls" to the kitchen and rather have little or no schooling; this is scarcely the kind of man to aid the state in securing good mothers or parents either in training for work in the home or the world properly. If Henry James or Dr. R. W. Parsons[2] would reason out the kind of school training, the few hours given to it, the possibility of being in a better room or building than their own home or its surroundings, he might have seen the etiologic factor more easily at fault than education. What about the current style of life, the strain of city living, with its drugs and alcoholic stimulation, the craze for money-making and question of extremes in dress, the multiplicity of clubs and societies of all

[1]Northrop, *Journal of the American Medical Association.*
[2]*New York Medical Journal, February,* 1907.

kinds? These seem to me to be far more the cause of neglect to the child and its loss of home discipline, for today it is almost expected an infant needs no looking after. The fact that early training is not necessary and then no discipline or obedience is exacted, as well as wrong feeding (pre-natal and post-natal) of unsuitable dishes and acids before meals. The faults in the "political" school boards are not often those best suited to show the needs in education for better teaching (7, 25).

In the fundamental branches, necessary reading to broaden the mind and encourage quiet, studious habits during the school years leaving out social life and following the rule of food, rest, sleep and play, or exercise, is needed to stimulate and aid the hygiene of the body. Education, far from being harmful, is helpful, but it must be watched and worked with reason in all things, with the foundation in the home life of help, regularity, quietness and encouragement.

Another factor in a territory so large as the United States of America must be considered in aiding students: The variability of the kinds of schools and colleges in matters of teaching subjects and especially standings. The concentration of fewer and better colleges or institutes of learning, raising them to an equal standard in the main branches, would aid all students who want to take professional or commercial standing. It would enable university teachers to get a more uniform grade of students so far as individuals can work together. The lack of uniformity makes it difficult to grade students to their respective years, and a consequent overlapping of study hours or extra work and thus interfering with the course, especially in a professional school. Given then a student who has been raised under these conditions, and we are speaking of the majority, how difficult it is to train him in any of the professions, and we need adjustment in all. This brings up the question of what best to do if I want to qualify in both medicine and dentistry. Which shall I study first? Is there any value in taking both (4, 19, 20, 24)? As all learning helps, we need not hesitate to answer, "Yes, it is of value." Is the medical curriculum broader than the dental? Some say yes, and others, no, for each school has its own special subjects; for instance, obstetrics gives way to metallurgy, dermatology to comparative odon-

tology, gynecology to prosthesis, medical jurisprudence to dental technique, etc. We all sympathize with this plea for acquisition of a greater breadth of knowledge, but what constitutes a broader education? It is not the greater number of subjects, but the way they are understood and applied. Will it develop a greater operative or mechanical skill? No, that demands practice and years of work, but it will aid in reassuring the worker, for he has considered the case from all points, knowing his ground work, the particular function and deviation from that state, together with the far-reaching consequences, and hence the best method of repair to suit the individual in his own especial sphere of life and work. The strongest argument is made in the fact that dentistry is but a specialty of medicine (using the term medicine in its broadest aspect) and ranks much as the physician does to the surgeon, the orthopedic man to the dermatologist, etc., and they need no special diploma for such. As all oral or stomatologic conditions are seldom or never only local, a better knowledge of the body in all stages is to be advised, so as to understand both the constitutional and other causes in the etiology of the disease and its remote effects (10, 11, 18). Otherwise we cannot obtain the best results for our patient and could not honestly be said to use our own best skill or attention in the treatment of the case which, from the legal aspect, is the vital principle on which is based the recovery of fees and to prove successful treatment of the patient. Another argument accepted by some is that it would improve the social and professional status of the profession. This does not appeal to me so strongly, for this fact is determined usually by the behavior, skill and manner of the individual, which may place him in the foremost rank according as to how he has adapted himself to his profession and his ability to follow the rules of life. It is our own fault, to some extent, if the medical profession look down on us, for we are in danger of becoming not only mere mechanics but poor ones unless we understand stomatologic problems better. Even in orthodontia, principles and facts are being forgotten or put on one side, to the detriment of the patient, the dentist, and the result in the case. Too complicated appliances, over-regulating and changing portions of all structures of the oral cavity, with little regard to the idiosyncrasy of the patient, can

do harm; and this fact seems to be lately forgotten in the anxiety to move the offending teeth. Simple principles of anatomic facts as applied to the jaws and teeth should be well thought out and the articulation and position of the facial bones considered before the regulating of the teeth is done. Men like Drs. E. S. Talbot (35, 36), G. V. I. Brown (10), E. A. Bogue (11), have taught us first principles from the standpoint of degeneracy and retrogression as a primary cause of these pathologic features, while Dr. M. H. Cryer (12) has given us the anatomic relations and actions, with many new facts hitherto disregarded, together with some anomalies, whilst Drs. T. W. Brophy and John S. Marshall have instituted methods of operation and Dr. G. V. I. Brown a combination of all to aid in both the work of the dentist, stomatologist, surgeon and rhinologist.

Is it not true of our profession, as of others, that it is the character and skill of the man that elevates the calling and not the calling that elevates the man? As the years roll on are we not continually winning to our ranks, gentlemen of education and character, of scientific training and skill, who will have the respect for their vocation it commands, for it is a profession as honorable as it is useful, and "utility alone is the raison d'etre of our existence," said Sir John Tomes. If we respect ourselves and do our duty, others will respect us, but we must do more general reading—follow out our lines of reasoning on a broader and firmer basis, if we want success.

In some countries a demand is made for a dentist to become an M.D., or he cannot hold a hospital appointment. Some institutions demand only a medical qualification and ignore a dental diploma in giving their appointments. Medical men who study in the celebrated continental schools invariably are satisfied with their degree and seek experience and not a diploma. It must be remembered *the average candidate prepares himself in strict regard to the requirements of the examination for degree and no more.** Here, gentlemen, is a fault; we should encourage the student to use some time for reading, and especially should he be taught how to make a research subject during the last year or two of work; for the practice and experience gained by it in any line he

*Dr. T. L. Gilmer, DENTAL DIGEST, February, 1908.

may choose under direction as a "thesis" would increase his insight into many points, broaden his knowledge, give strength to his efforts, and encouragement by the stimulation of doing original work, and aid in giving new facts to the study and a remembrance to use and see what others have done in all parts of the world, infuse new suggestions and create other methods of work as well as bring out more relations, and so give credit to the professional man for furthering his profession. Criticism and discussion, if properly given, are very needed, and only in this way can one benefit in his work, hence the value of society meetings at proper intervals. Time should be given to bring out new ideas, new subjects and new results. The tendency of the multiplicity of congresses and society meetings, as at present, is to repetition rather than to offer any new ideas, though it may give acquaintance to others in the profession. By all means have an educated dentist, but his education must be thorough. "The best thing is to know a thing, and know it thoroughly," even more accurately, for accuracy differentiates scientific from general knowledge. If the medical and dental student could take the same elementary studies with the same standing, great benefit would be derived for both. The third and fourth years could be specialized, as each might require for their distinctive work, and with benefit to both varieties of students, for the reason that dentists may have to undertake operation work, giving anesthetics, avoiding legal debates and questions as to their rights by some members of the medical side. The D.D.S. degree does not permit the responsibility of death, should such an accident occur in the office, even when it might be from causes which are strictly within the field of dental operations. In some countries, a dentist cannot have anesthetics used without the presence of a physician, and yet, we are told, they are competent to practice in their own specialty under their degree. There is no denying the possession of the M. D. is broad in its scope of granting power, for it carries with it the right to practice in all fields, and this is needed by any up-to-date stomatologist. The public has a right to demand that a dental surgeon has the privilege and knowledge to take care of his case in all its aspects, and especially is this true in these dreadful, far-reaching septic cases, and we may ask, would a dentist, taught as he has been, so far be able to recognize and guard the case from

endocarditis, pyemia and those other complications and feel it was within his legal right to treat the case, especially if death should occur? I cannot do better than refer every member of our profession to read "The Necessity for Reform in Dental Education," by D. D. Smith of Philadelphia (4, 26), whose paper is worth study, for the doctor has fully covered the ground I should take in most instances. Where does the fault lie and how can it be remedied? Educate both sides of the profession to unite in doing good by close communion and discussion in all our work. Joint meetings with societies in symposium and by demonstrations. Such statements as the laity hold in reference to administration of nitrous oxid being exceedingly dangerous to them, and especially if heart trouble is thought to be present, should be corrected by better knowledge in the medical man in view of the fact it is now used so much for preliminary anesthesia before chloroform and ether, etc. Patients are more liable to die from shock or paralysis of the vasomotor centers through fear than from a carefully given nitrous oxid and oxygen anesthesia. The closer union of both students in the elementary work would benefit. Where is the need for a shorter course or less practical one in physiology, anatomy, histology, therapeutics, embryology, biology, etc., than for medicine? Why have double courses in these branches, which in itself lowers the standard and causes enmity and disgust between the "medics and dents," and at once establishes a lower grade for the dental students? It is well within my recollection when dental students were requested not to attend the courses in bacteriology, pathology and practical physiology in one of our State Universities, for, said the professors and demonstrators, "What in the world do you want with it; you only take up room and time and block the medical students in the classroom, and it's useless to dentists." In view of this, those students got little if any pathology, and how did they know or really understand the terms pulpitis, interstitial gingivitis, phagedenic stomatitis, and the far-reaching effects of toxemia, vascular disturbances in the teeth and mucous membranes? The more practical work taught the better we group our ideas and fit the theory and practice together. Manipulation, technique being ideally necessary for both schools. Could not some arrangement be made by which both classes should follow out the work for the

full degree and then let the specialties be taken up as each man preferred in the last year; the morning session being confined to his prosthetic or mechanical side and the afternoon to the operative? When the candidate has been well taught by demonstration classes and similar work and has passed most of his theoretical studies he gets more value in applying them to clinical work under good and frequent observation of well-trained demonstrators or instructors, and few schools have the properly trained assistants or enough in their operative courses. Many complaints have I heard from men in schools who seldom or never obtain attention from those in charge, for there were not enough men to help. Why is it in this country an eminent teacher has not a corps of trained men ready to help him and to carry out his ideas, and so in event of sickness or leave he would have the pleasure of knowing an ambitious, honorable, energetic set of men were trying to show him they were keeping up the department standard and that he could feel sure good work was done in his absence? Why cannot those students anxious and willing to work in special lines find openings for them? No encouragement is given them to study out some of those unknown problems now occupying the attention of German and English investigators. I know of more than one instance where a man was well trained, anxious to give such time as he could to study or research, who was a demonstrator and instructor in one of our oldest and most prominent universities for some years. As practice came in he still gave his time, which was of considerable value, much against the advice of family and friends, and then desiring to study up some important histoembryologic points in relation to medicine and dentistry, begged permission of the chief of his department to have one of his most promising and eager students (who was engaged in post-graduate study) do all the routine technique work to leave him extra time to look over specimens and dissections, etc., giving up to this young man his small salary to encourage him, as he needed pecuniary assistance or he would have to practice. The chief took the matter under advisement and my friend showed me his report, which notified him that on account of his lack of time and indifference his place was filled by Dr. X. Gentlemen, think of the effect on this

man, who had spent hours and years of work in that celebrated university! A fellowship holder, who had studied abroad and received nothing but encouragement to go on and do his work from men whose names we all revere as masters of their subjects, a science of arts and medical graduate, of prominent social standing who had given more than money in day and night study between the exactions of a larger and lucrative practice, but who preferred to do research and follow some suggestions along the lines of His, Walkhoff, Andrews, Lepkowski, Spee and others was promptly turned down. This, I deeply regret to say, is by no means an isolated instance. I have told this because it has always been incomprehensible to all who know the man and is regarded as an instance of autocracy by the head of the department or fear of the younger man's success, and when it occurs in our leading schools, is it any wonder men are afraid to try to study out the problems and so delay their own chance of being first in the field of practice and gaining a living. Why do we not see or hear of the universities urging many to follow some line of research? To show a man how to study is a valuable training and so utilize what he has learned. Would not such work, be it ever so little, even if only one fact gained, give assurance and faith in himself? The heads of departments surely ought to have a large following of men eager to be their students and do their work, but due recognition and some inducement must be given in return, for many of our best men are those who are self-made, who go through college under great difficulties and hardships. To those who have crossed the water this aspect of a man for himself seems a little selfish, for much good material is going to waste that universities should, could and must use for the betterment and progress of all our professional work. Where do we see the chief and his corps of regularly graded assistants ready and able to save much of the routine of daily or operating room work? The organist seems to work alone instead of two or three registrars ready, willing and anxious to show his manner of conducting a service in his chief's absence. Look at the comfort and pleasure gained to know in event of some sudden call for a vacation, a sickness, every care will be taken by the senior man to give as good as his experience will let him. Gentlemen, you teachers and older men in our profession, take these men in hand, help them by example, encourage-

ment to do some work for you in some line of research, and I am certain you will not be disappointed. Open your laboratories in universities, in your offices, and give many a chance to train up dentists worthy of taking their standing in full professional knowledge and ability. You will do well to follow such men as Virchow, Billroth, Weigert, Kölliker, His, Pasteur, Foster, Huxley, Darwin, Tomes, Taft and Garretson. To the question of whether there is a necessity for medical education for dentists, I can only say as the years go on the need becomes greater, and my views are more strongly in accord even than when urging it in my former papers and teachings, for stomatology is as much a branch of general medicine as ophthalmology, laryngology, orthopedics or any of its subdivisions. The teeth and gums, palate and tongue depend for their growth, sustenance and pathology upon the same general nerve and blood supply as that furnished other special tissues of the body, and all are subject to the same disturbances.

To properly treat or preserve a given part whether by mechanical means or otherwise, it is essential to understand all the relations, means of anastomoses and sequelæ. There are so many points in common that if I mention the disease of the accessory sinuses in general and the maxillary sinus viewed from the standpoint of the rhinologist and dentist as being of especial interest on account of the close relation of the latter to the teeth and to the other sinuses it will be a good example. As yet authorities disagree as regards the origin of the disease as dental or nasal. The larger number, if not all, believe the teeth as well as disease of the nasal mucosa to be etiologic factors, and Fränkel, Moritz, Schmidt, Semon, C. Heath, Grunwald and Boyer assert that disease of the teeth is the most common cause of diseased antra. Again, equally prominent men, as Zuckerkandl, Krause, Hartman, Bosworth, Cryer, assert that in the majority of instances disease results from pathologic conditions of the tissues of the nasal cavity. Herbert Tilly of London recently reports three hundred cases seen in the last ten years and in only one of which sound teeth were found. Frankel, Kyle, Lermoyex and Bodecker regard diseased teeth as the most common cause. Killian believes infection not due to teeth; Hejek in two hundred cases found only thirteen of dental origin. Cryer says more teeth are diseased as

the result of empyema of the antrum than antra infected from diseased teeth. As for nasal origin we all know the havoc influenza has caused, and last year (1906) this was particularly so, resulting in many dead pulps. These are cases in which, I regret to say, the medical men are not so particular as they should be in examining the oral conditions, and the dentist forgets in many instances that these accessory sinuses belong as much to his department as the tongue, salivary glands, etc. Knowledge of the part systemic remedies perform in dental disease is as yet in its infancy; little investigation has hitherto been done or the effects carefully studied. Dr. Leo Greenbaum has called attention to the value of asafetida in cases of hypersensitive dentin and the use of small doses of synergists as advocated by Dr. Sheinkman.

In a paper in the *Lancet,* "Dental Disease and the Medical Profession," by R. D. Pedley, is a note with regard to the lack of reference to carious teeth or oral sepsis as an important factor in the production of disease in the various textbooks on medicine and surgery. No one thinks of the importance of a clean mouth for the patient or in the group around the operating table and room. "Of course, there are books where the dental surgeon has written a special chapter, but it will not have the weight or authority to the medical student as if written by the physician or surgeon himself." (Pedley.)

To the ever-increasing requirements in all professional schools we must not forget the general practitioner needs all his resources to cope with the various diseases incident to life. Therefore some care should be instituted to see that a thorough foundation should be given in physiology and anatomy, if these subjects are taught so as to work together with the science of pathology placed so as to bring out the thinking capabilities of the student; we have a far better chance to follow out the practice of diagnosis and treatment, for all our work depends principally on these three studies, as does the building on its foundation. The preservation of the roots and remaining parts of pulpless teeth in modern crown and bridgework is of exceptional importance. Unfortunately, it is the many rude, imperfect and badly fitted appliances and bands which bring great discredit on the profession, and a temptation to put bridges where anatomic conditions will not allow and the first principles of mechanics pass unheeded cause

much sepsis and suffering as well as recession of the gingivæ and loss of the teeth. (16) We must often agree that the defects in fillings and crown and bridgework lie in the imperfect treatment and devitalization of the teeth; unscientific and, therefore, defective construction of the bridge, which requires experience, a high degree of skill, time and conscientiousness. And what must never be forgotten, the consideration of the predisposing, general or systemic condition of the patient as well as the local conditions ever present and peculiar to each, for "every man is a law unto himself," and no one rule or treatment can cover all.

Every surgeon, so-called, is capable of approaching the healing art from two directions. The one a purely therapeutic one, the other along the road of mere mechanical construction, and this is just what the dental surgeon does. Hence, it is a specialty and is allied to surgery, mechanics and drug treatment. The reduction of one year from the length of time a student should devote himself to mechanical dentistry in England is showing a trend in the direction by leaving him more time to acquire knowledge of the scientific side of his future profession. Another step in advance is the establishment of a clinical laboratory and appointing a clinical pathologist at the Royal Dental Hospital and College. Mr. Lloyd Williams, in the *British Medical Journal,* said that dental surgery was passing through a critical period, and urged all to combine to endeavor to secure its emergence in a proper position among professions, just as in the case of surgeons, painters, sculptors, mechanics entering largely into their work; but nevertheless the practice of dentistry remained a profession—an art and not a craft. The formation of a dental section in connection with the Royal Society of Medicine was a step in the right direction and shows that dental surgery must be scientific. It answers all definitions found in any dictionary. Moreover, the surgeon does not possess that useful and beautiful skill that a well-trained dentist has. While the former can remove certain parts of the body, he, unlike the dentist, cannot restore said removed parts even to the extent of a good home crutch. But when stomatologists or dental surgeons cease to be mechanics, undertake the treatment of diseases of the mouth, which include minoplasty, uranoplasty, cancrum-oris, actinomycosis, fractures,

dislocations, irregularities, etc., they are practitioners of medicine or surgery. Gilpin declares that "people frequently reject great truths, not so much for want of evidence as for want of inclination to search for them." In closing I will summarize as follows to answer my title:

1. Dentistry is a specialty of medicine.

2. A thorough medical education with the special dental subjects as operative and prosthetic branches is essential to the most successful practitioner of it.

3. It should be placed on an equality with other specialties of medicine by special training.

4. It is important that accessory scientific study and practice of dentistry be made instead of considering it a merely manual art.

5. The degree of medicine possesses a title quite extensive enough in its significance to embrace any specialty that he may elect to practice; it affords the only possible bond of brotherhood with the members of the profession at large. Why should we need a special degree unless to prove the specialty or as a post-graduate study, just as the varieties of engineering, etc.? For, obtained as it now is, it is pointed out as a badge of partial culture, is a cause of jealousy and personal animus in those schools connected with medical departments or as showing only a smattering of knowledge, even though they may far exceed in point of general literary attainments, scientific or even in special medical culture, many of our physicians.

6. A universal portal of law should be enforced that all who practice the art of healing in any degree whatever (whether medicine in any branch, homeopathy or Christian science) should be legally qualified general practitioners and all pass through one and the same course of examination, irrespective of school, theory, specialty or hobby, and so guarantee some safety and knowledge to the public before handling disease in any form, and be eligible to practice in any state of the Union without discrimination.

7. Such a course is necessary to treat the purely surgical and plastic operations, secure legal redress, and to hold a learned and social position in our profession.

8. The progress of the profession depends on the continued effort of specialists, but only those fitted by years of experience in

general practice and then special study and inquiry along certain lines should be considered as such. Specialism is the inevitable outcome of the extension of medical art and science, and it is utterly impossible for one mind to master all branches made.

9. Specialism in any branch requires broad knowledge, education, experience and the careful weighing and study of the problems offered by the anatomy and physiology of the body in its pathologic condition and the underlying principles of accessory subjects of evolution and retrogression through miscegenation and environment.

10. Dentistry or stomatology is the art of preventing, treating, curing and alleviating pain and diseases of the teeth, jaws and oral cavity, with its allied structures, depending, in many instances, on remote medical causes and not purely dental or local, and, as such, requires medical and surgical knowledge and education. It is, therefore, a specialty of medicine and vitally necessary in everything, whether it be in operative or prosthetic dentistry, to fully give a patient the proper care and treatment legally and medically required and which is every man's due and right to receive at our hands.

11. The lack of harmony and appreciation of each branch of the profession that is known to exist comes from the recognition between the qualifications of dentists on the one hand and physicians on the other—the result of partial training on either side. The M.D. has graduated, knowing little or nothing of the lesions of the mouth and their far-reaching dangers, while the dentist has not been sufficiently educated, medically and surgically, to qualify him in the eyes of the laity or profession for practice as a medical or surgical specialist. Until the fact of this missing link is fully recognized, the community will fail to receive the benefit from either class which it is desirable and right it should secure.

12. As oral specialists, its members will command respect only by special qualifications. If they take rank with physicians, surgeons, opthalmologists, aurists and dermatologists, or any other recognized specialists, it can only be by professional recognition, not only of the necessity for such specialty, but by reason of the proof that its members have earned, by preliminary education, practice, experience and research work, the well-earned title of stomatologist, dentist or oral surgeon, and, as such, the necessity

of a good medical and scientific education is well known to everyone.

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THE UNITED STATES PHARMACOPEIA.

BY ROBERT A. HATCHER, PH.G., M.D., NEW YORK CITY. READ IN THE SECTION ON PHARMACOLOGY AND THERAPEUTICS OF THE AMERICAN MEDICAL ASSOCIATION, JUNE, 1907, AND PRINTED BY COURTESY OF THE JOURNAL OF THE ASSOCIATION.

It is not my present purpose to add to the many reviews or criticisms of the pharmacopeia, but to call attention to two conditions, hoping that steps may be taken by this section looking to their improvement.

The first is the general loss of interest on the part of physicians

in the revision of the pharmacopeia. The pharmacopeia was called into being by physicians in 1820, and in 1850 pharmacists were admitted to the convention; since then physicians have gradually relinquished control to pharmacists, and today we are confronted with an anomalous condition, in that the committee of revision of 1900, consisting of twenty-five men, numbered nineteen pharmacists or men identified with pharmaceutic institutions, and but six whose interests were entirely with medicine. For example, Dr. Squibb was almost universally known as a manufacturing pharmacist. Only ten members of the committee of revision had the title of M.D.

This condition is not creditable to the medical profession, for it is obviously not the province of pharmacists to decide for physicians what remedies they are to use.

I do not think it is generally realized to how great an extent the medical profession has neglected its manifest obligations in connection with the pharmacopeia, leaving the work almost wholly to pharmacists. Less than half the states had medical delegates accredited to the pharmacopeial convention in 1900. Six states named pharmaceutical, but no medical, delegates. Ohio had three medical delegates and New Jersey had one, accredited, but not one from either state attended the convention. Besides these two great states and many of less importance, Iowa, Virginia and North Carolina were wholly without medical representation in that convention, and the following states each had but a single medical delegate: Missouri and Indiana, the fifth and sixth states in the Union in population and importance (Dr. Whelpley's interests are mainly pharmaceutical), Georgia, Minnesota, Connecticut, Nebraska, Kentucky, Tennessee and Wisconsin.

In contrast with this showing it may be mentioned that the pharmaceutical organizations of New York named twenty dele gates and those of Ohio named fifteen. From these figures one may gain some idea of the preponderance of pharmaceutical over medical influence in that convention.

So far from finding fault with the pharmacists for this condition of affairs, I think their spirit is worthy of emulation, and I think they may point with pride to their share of the work. It is with our own profession that the blame rests for this condition.

The second point to which I wish to draw attention is the want

of a genuinely progressive spirit in the matter of admissions and dismissals. A very important object of the pharmacopeia is to provide an authoritative list of remedial agents. It should represent all that is best in therapeutics. In order that the pharmacopeia should command the respect of physicians in the highest degree and secure the earnest support of the leading men of the profession it should, so far as possible, embrace every non-secret medicinal agent of unquestioned merit, regardless of its nature, while every article of doubtful value should be dismissed.

It is hardly necessary for me to add in this connection that I do not advocate the admission of every astringent, nauseant, diuretic, cathartic and bitter, but only of those of each type which possess distinct advantage over others in some particular condition.

If we can rid the book of all useless material and fill it with all that is best, and only the best, and maintain it at that high standard of excellence, it must inevitably command the admiration and enthusiastic support of the ablest men in the profession. For, while I recognize its imperfections and shortcomings, it seems to me that the greatest need at the present time is a strictly progressive attitude toward the question of admissions.

I shall not soon forget the fine contempt and scorn with which one of the most respected practitioners of New York—a firm supporter of the pharmacopeia and one but little given to prescribing unofficial remedies—spoke of the admission of an "imitation of antikamnia." Is there anyone in this audience who will maintain that antikamnia represented a distinct advance in therapeutics? If it did not, the best excuse for its imitation by the pharmacopeia is still only a very poor excuse.

Is there a physician worthy of his degree who is unable to write a prescription for acetanilid and caffein? Doubtless the inclusion of this imitation antikamnia aroused the enthusiasm of many whose therapeutics are taken from the wrappers of nostrums or some manufacturer's pocket therapeutics, but for each friend so gained it lost the respect, to that extent, of such a man as the one to whom I have referred, and the good opinion of one such man is better for the cause of permanent progress than is the enthusiasm of a host of the other kind.

While this compound acetanilid powder represents the most ob-

jectionable of the admissions to the pharmacopeia, there is another type, the elimination of which will cause much greater opposition—I refer to the many hoary representatives of obsolete or useless substances which have been retained wholly out of deference to the sentiments of a goodly number of very respectable, but not progressive, practitioners, who use the remedies which their honored preceptors used before them without any definite idea of just what they expect to accomplish thereby.

The representatives of this class of substances are so numerous that I fear to mention one member lest everyone present should name a better (or worse), but sarsaparilla, syrup of lactucarium, cannabis Indica and its preparations, lappa and calendula, may be cited as examples. There are numerous official substances which are not even mentioned by the standard text-books on therapeutics and pharmacology. I should be glad to have a clear and concise exposition of the pharmacology of the compound syrup of hypophosphites.

It has been argued with much reason that it was necessary to have an authoritative standard for many articles in domestic use; this argument has lost much of its force, so far as it applies to the pharmacopeia, since the National Formulary has been clothed with legal authority, and that work should relieve the pharmacopeia of this hindrance to its upward progress.

Another strong argument used in support of the retention of many substances which the committee of revision would hardly commend individually is based on the wishes and sentiments of many men of a great diversity of interests, education and ideas

If we are to strive only for the best we shall be forced to do some violence to the ideas of those who, through sloth, incompetence or misfortune, are unable to keep step with the march of therapeutic progress.

It is true that the pharmacopeia must serve a diversity of interests, all of which are represented in the direction of its affairs. but with the spread of scientific training we are coming to a better appreciation of the fact that independence is not incompatible with deference to the opinions of those better informed than ourselves, and with each revision we should approach nearer to the ideal.

With the progress of this idea it will be increasingly improbable that a substance shall be admitted to the pharmacopeia be-

fore it has been carefully considered by competent pharmacologists and clinicians.

If we accept rational progressive therapeutics as the touchstone by which we are to decide all questions concerning admissions to the pharmacopeia, it will be comparatively easy to eliminate most of the dead matter, and it will aid in the selection of all that represents actual progress in therapeutics.

It is imperative that effective provisions, not mere authorization, be made for additions as fast as new remedies are proved beyond reasonable doubt to possess actual merit, for more progress is now possible in one year than was made in the ten years from 1820 to 1830.

It is of almost equal importance that an official article which has been superseded by a manifestly better one should be dismissed. This would serve notice to the practitioner that the article in question had failed to measure up to the standard of the best then in vogue. There are not many who would prefer to employ a remedy so discredited if the merits of pharmacopeia were more generally esteemed.

Physicians will employ whatever appears useful to them, but at present we have no legally authorized guide in the matter of very many agents, and amid all the misrepresentations there is little cause for wonder that the physician should be duped occasionally, but it is remarkable how systematically, persistently and amazingly he allows himself to be cheated, humbugged and even disgraced by the wily swindlers.

If such a thoroughly progressive policy should be adopted it would place a greater burden of responsibility on the committee of revision, for on the wisdom which that committee displayed would depend the use of pharmacopeial substances instead of the most skilfully vaunted nostrums.

Should that committee not be progressive it would leave the door wide open in the future, as it has been in the past, for the introduction of a host of compounds for each new substance which might come into deserved notice. Thus the early admission of urotropin would have done much to prevent the flooding of the market with the same product under a variety of names, which added much to the confusion of the nostrum-guided practitioner.

If, on the other hand, there is not painstaking care and wisdom

displayed in the selection of substances to be admitted, the good opinion of the ablest men in medicine will be forfeited.

This is exemplified by what has been said with regard to compound acetanilid powder. This also illustrates the type which has served its doubtful purpose and should now be promptly dismissed.

So great would be the responsibilities of the therapeutic committee charged with this duty that it would be necessary to have a number of men of great ability, breadth of view and undoubted integrity, who could give much time to the subject, for it must be conceded that in the effort to keep the pharmacopeia in the van of therapeutic progress the way would be left open for great scandal if the men charged with this duty were not above the least suspicion, either as to personal integrity or the faithful and painstaking performance of exacting obligations.

Medical education is making such rapid strides that we have every reason to demand a higher standard of usefulness for the articles to be admitted to the next pharmacopeia.

There are at present several well-known pharmacologic laboratories in operation in charge of such men as Abel and Sollmann, and there is no excuse for the clinical use of new agents before they have been thoroughly tested on animals, and the evidence is not lacking that this branch of medical research will make considerable progress in the near future.

The great medical colleges, with their ample hospital facilities, are making strenuous efforts to secure capable clinicians—men trained to accurate observation—and their work, supplementing that of pharmacologists, cannot fail, in the vast majority of cases, to possess advantages over that of the man in private practice not nearly so well situated for controlling his patients and not usually so well trained in accurate observation.

We should look to men with such advantages—clinicians and pharmacologists—for guidance in the choice of the official materia medica, rather than to the preponderating numbers entitled to representation in the pharmacopeial convention, if we are to place the pharmacopeia in the forefront of therapeutics.

The committee of revision was empowered to secure expert advice in matters pertaining to chemistry, and there is every reason why this policy should be so extended as to embrace the results of pharmacologic and clinical research, for many clinicians and

laboratory workers are deterred from investigating proprietary remedies by the fact that notorious methods are so commonly pursued by nostrum makers in securing pharmacologic and clinical reports. I may recall to your minds the exposure in *The Journal* of the American Medical Association of recent date of the pretended clinical study of Gude's peptomangan in anemia by Mateo M. Guillen at the City Hospital on Randall's Island.

Fortunately for all interests concerned (except those of the nostrum maker) the reaction against the truly disgraceful condition which has prevailed in therapeutics, and which had grown steadily and rapidly worse, has resulted in the awakening of physicians to the importance of the pharmacopeia, and it is becoming much better known to the medical profession. Owing to this increasing interest in, and popularity of, the pharmacopeia there should be a large sum available for research in the preparation of the next revision, and it may be considered as certain that any expenditure in that direction will yield a return many times greater than the expense incurred.

If the reaction is to gain impetus we must arouse in physicians a livelier sense of responsibility in the matter of revision. This was argued by Mr. Wilbert in a paper presented to this section a year ago, and I can do no better than to reiterate what he said then.

It must come to be considered a distinction, a privilege and a duty on the part of delegates to be present and to participate actively in the deliberations of the pharmacopeial convention.

That this has not been true in the past is shown by what has already been said and by the fact that of the physicians actually named as delegates to the convention in 1900 more than fifty failed to attend. Indeed, it may be safely stated that less than one-tenth as many medical delegates participated in the deliberations as would have been eligible had a proper interest been aroused.

This section and its officers cannot escape just censure if no steps are taken to prevent such a wholesale neglect of duty on the part of pharmacologists, at least at the time of the next convention.

Despite all of this indifference on the part of physicians, many of whom know practically nothing of the pharmacopeia, its origin

and its many excellent features, we constantly hear them sneer at its imperfections.

The American Medical Association can use its vast influence to no better purpose than in getting the best men in medical circles to give heed to the claims of the pharmacopeia on their interest and their efforts. Then, and only then, will it cease to be the fashion to sneer at the defects of the work—but rather will it be held in the highest esteem as representing the best in medical, even as it does now in pharmaceutical, circles.

GUTHYMOL.—Thymol added to guttapercha makes a very useful preparation for dental purposes. It possesses very desirable working properties, setting slowly and becoming hard. I have used it successfully as a temporary stopping and filling material for children's teeth; also as an insulating material and to crowd away overhanging gum margins and to obtain impressions of cavities.

To obtain a satisfactory grade of guthymol, add to base-plate guttapercha a five per cent. solution of thymol and soften the guttapercha under heat. A mixture of guthymol, oil of cajuput, and a few fibers of asbestos makes an excellent root-canal filling.

When ready to fill a cavity, add to the required amount of guthymol a few crystals of thymol and spatulate the mass thoroughly, when it will acquire a degree of pliability which renders its insertion in a tooth cavity an operation of the simplest character.—CARLOS ZACHARIAS, *Dental Cosmos.*

PHYSICIANS AND DENTISTS SHOULD CO-OPERATE IN ANTRAL TREATMENT.—In the work of prophylaxis, however, I think the need of co-operation is seen even more than in the treatment. We need only to note the special anatomic relation of our special fields, and see the play of causal forces as they move backward and forward across the antrum. We see that the nerve and blood vessel twigs, which supply, respectively, the innervation and nutrition to the dental and rhinologic fields, proceed from the same trunk. A disturbance of the innervation and nutrition in the one, reflexly, and often directly, affects the other; but, what is of still greater importance, the very geographic position of the antrum, sandwiched between the open-air nasal fossa and the alveoli—where the bottom of the alveoli actually makes the floor and the outer wall of the nasal fossa one of the larger boundaries of the antrum. The full significance of this intimate relationship will only appear when we appreciate that one network of lymph glands and lymph channels also covers this entire dental and rhinologic area.—A. L. SOLENBERGER, M.D., *Dental Brief.*

Digests.

THE EFFECT OF AN EXCESS OF MERCURY UPON SHRINKAGE, EXPANSION, STRENGTH, CHANGE IN COMPOSITION AND STABILITY OF DENTAL AMALGAM ALLOYS. By Marcus L. Ward, D.D.S., Detroit, Mich. In the preparation for no other profession have sincerity, official supervision, a high degree of technical knowledge and a high code of ethics been more vital than in this chosen one of ours; and yet, within the decade, the societies of nearly every state in the Union have taken cognizance of the peril of too little dental training, and as a result the standard necessary for admission to the colleges, the curriculum in these colleges, and the conditions imposed by state boards of registration have been raised.

This apparently concerted action of the profession to develop new standards, new ideals—in fact, a new profession—is so rapidly becoming manifest that every live man to-day must feel that he has a duty to perform outside the regular practice of dentistry.

It is with this sense of duty, rather than renewed enthusiasm to encourage a more generous use of amalgam, that I assume, along with other responsibilities incidentally connected with this subject, the task of explaining the effect of an excess of mercury upon dental amalgam alloys. I assure you, the more I work with this material the more conscientiously can I criticise those who use it too freely.

Since amalgam came into general use there have been a great many mythical properties imputed to it from different methods of uniting the alloy with the mercury. To many of the more profound these mysterious and often intricate methods of manipulation of others have meant nothing, and have been regarded as one of the idiosyncrasies of those practicing such methods; but to a great many they have been regarded as some of the unexplained though necessary things to be practiced, and at the sight of some new method of mixing the alloy and mercury many would decide to change their technique, and by so doing discover one of those unexplained though highly necessary methods for themselves.

One of the highly esteemed members of the profession comes to our meeting and does an operation with amalgam. He mixes the alloy and mercury in an ordinary rubber finger-cot, explains that he has done it for years, and attributes the major part of his suc-

cess with amalgam to this one feature of his technique. You ask him what his reasons are for it, and he replies that it is nicer that way, that the filling wears better, etc. The truth is that he expects the rubber cot to impart some of those mysterious properties and change shrinkage into expansion, excessive expansion into shrinkage, improve the strength and color and permanence of form.

Or again, another member performs an operation with amalgam, and mixes the alloy and mercury on a glass slab with a large spatula. He likewise attributes a large amount of his success with this material to his treatment of the alloy and mercury. You ask him what his reasons are for it, and he replies in the same way, while the truth is that he really thinks that some decidedly desirable property comes from the glass slab and spatula.

Another member performs an operation with amalgam, mixing the alloy and mercury in his hand; another uses the mortar and pestle, while yet another uses the mortar and pestle first and then turns it into an aseptic napkin to finish the mixing. This is, indeed, but an incomplete list of the methods employed by the various men in our profession, and might well appear to the layman an unquestionable exaggeration. It is true, nevertheless, and is unmistakable evidence of how little real thought has been given the subject by many of the men in our profession.

In like manner have the successes of many been attributed to the fact that the proper proportions of mercury and alloy have been used; while they have endangered their success, and perhaps by some other particular in their technique have involved consequences of almost, if not quite as much, danger as the conditions they have sought to remedy. A number of men have given so much stress to this feature that they have completely lost sight of others equally important.

It seems that many regard the proper proportions of mercury and alloy as secured by using that quantity of mercury which will unite with a quantity of alloy to form an amalgam. This is not the case; instead, it is the amount of mercury which is to be used with a given amount of alloy to make a plastic mass. After the mass has become plastic and the alloy well dissolved, a little mercury is to be removed. Let me state here that it is seldom practical, and with the rapid-setting alloys is impossible, to make a plastic mass with only just the amount of mercury that is to be left in the filling. A

slight excess of mercury is required, if we put the alloy anywhere nearly into solution at the time of making the filling.

To illustrate more clearly, I will give you what actually takes place when tests are being made in the laboratory. When we are using one of our good high-percentage silver alloys that has come from the manufacturers recently, we follow the directions on the package, which usually state that the proportions are, approximately, mercury 7 parts, alloy 5 parts. Obviously, for every 25 grains of alloy we must use 35 grains of mercury. Now, there are two things, at least, that we must accomplish if we make a good filling—viz., we must make a mass that is smooth, fine-grained and plastic enough to enable us to pack it, and we must put the alloy as completely as possible into solution in the mercury.

Suppose we weigh out, instead of 25 grains of alloy and 35 of mercury, 25 grains of alloy and only 30 of mercury. The very first thing we discover is that we cannot make a plastic mass, and when a plastic mass cannot be made we certainly cannot put the alloy into solution completely, or evenly approximately. If we now add 5 grains more of mercury to the 30 grains already in the mass, we find that we can make a nice, smooth, fine-grained mass with the alloy well in solution in the mercury, and at the same time remove 7 or 8 grains of mercury. In other words, we have added 5 grains of mercury and removed 7 grains, simply because we have softened the mass. In this filling, then, we have used 25 grains of alloy and 35 grains of mercury to make a plastic mass, but we have left in the filling only 25 grains of alloy and 28 grains of mercury. Before going farther let me again emphasize the fact that the amount of mercury that will make a plastic mass with a given amount of alloy is a little more than should be left in the filling.

This, however, is not what we mean by an excess of mercury as we are considering it here. An excess of mercury is an amount which exceeds the proportions just mentioned to such an extent as to make the mass of alloy and mercury sloppy.

Since there are so many different alloys that behave a little differently from this class, and as a result deserve separate consideration, I shall be a little more specific and name some of the alloys that belong to this class, and define a little more clearly what this class of alloy really is. As you are all aware, since 1895-96 we have had furnished to us alloys commonly known as Black's alloys

—some of which are really made as he would like them, while others are only crude imitations. Fellowship, Twentieth Century, Triumph, Permaneo, Acme, Micrometric, Rego, True Dentalloy and Superior, and any others which are composed of from 65 per cent to 68 per cent of silver, 26 per cent to 28 per cent of tin, 3 per cent to 5 per cent of copper and 1 per cent to 2½ per cent of zinc, fall into the class that we are now considering, though we must not consider all alloys which fall into this class through the proper composition desirable ones to use, because shrinkage, expansion and strength are controlled by at least four things—viz., composition, fineness of comminution, annealing and the casting. Since this class of alloys is similar in composition and behavior, let us examine the proportions advocated by their makers on the circular matter accompanying each package of alloy:

	Parts.
Fellowship circular says	7 to 5
XXth Century circular says	7 to 5
Triumph circular says	7 to 5
Permaneo circular says	7 to 5
Acme circular says	7 to 5
Micrometric circular says	6 to 5
Rego circular says	5 to 4
True Dentalloy circular says	11 to 9

If we now compare the smallest amount of mercury with the largest, we find that there is a difference of 5/42 of a grain for every grain of alloy used. We note, then, that the proportions of mercury for our best quick-setting alloys are practically alike, and that they are all greater than the alloy.

In seeking an explanation of things, we are too often apt to be influenced in our estimate of the cause by the magnitude of the effect—to seek an hypothesis in the remote and the complex instead of the simple and the near; but, that I may give you a glimpse of several things from a new, or at least from an unfamiliar, viewpoint, I must refer you to the work of Black, the author, and possibly others. Black advanced the theory that when an alloy had been cut into a convenient form for use it must be heated a certain time at a certain temperature to make a product that would not be affected by the temperatures that it would necessarily be subjected to by standing around. He also advanced the theory, since recog-

nized as a fact, that with this heating less mercury was required to make a plastic mass. If we refer to the following chart we will see how this change took place in one of our best alloys, cast for me by one of our leading manufacturers:

Formula—Ag 68, Sn 26.50, Cu 4.20, Zn 1.30=100.

Test.	Time of Annealing at 49° C.	Percentage of Mercury.	Points of Expansion.	Manner of Setting.
1	0	63.00	19	Extremely rapid
2	1 day	59.00	7	Slower
3	2 days	58.00	3½	Slower
4	3 days	57.40	1½	Slower
5	5 days	57.25	¾	Slower
6	7 days	57.00	½	Slower
7	10 days	56.60	½	Slower
8	15 days	56.10	½	Slower
9	20 days	55.50	½	Slower
10	25 days	54.80	½	Slower

First let us notice that a large part of the changes in proportions that took place did so during the first two days, though it continued to change a little during the twenty-five days. Next let us notice that the same is true with regard to the points of expansion and manner of setting. Third, let us notice that the percentage of mercury, points of expansion, and rapid-setting tendency were all reduced with each of the first five days' annealing; but at this point I desire to call strongly to your attention the fact that while the percentage of mercury, the amount of expansion and the manner of setting go hand in hand with the annealing, there comes a time when the annealing has less effect upon the amount of expansion, though it continues to reduce the percentage of mercury required and makes the alloy set a little slower. When a manufacturer is preparing such an alloy for the market, he of course takes everything into consideration, though this material, like all others, has some qualities which are of more importance than others; obviously the amount of expansion and the manner of setting are of more importance than the percentage of mercury. From this we can see that if a manufacturer places his alloy on the market when it expands from 1 to 2 points, little or no change will take place in the amount of movement, though there will certainly be slight changes in the amount of mercury required, and the alloy will set slower

than when it was placed upon the market. If, then, a manufacturer tells us to use 7 parts of mercury and 5 of the alloy, that means that the proportions are 7 to 5 for a reasonable length of time, after which the proportions should be reduced; and if the alloy has stood on sale for a year or over it is not so desirable to use.

I have had in my possession now for nineteen months quantities of the following alloys: Twentieth Century, Fellowship, Triumph, Acme and True Dentalloy. When I purchased them nineteen months ago the proportions advocated by their makers were about right. The first mentioned required about 7 parts of mercury to 5 of alloy, while now I can make a nice plastic mass with 6 parts to 5 parts. The second required 7 parts to 5 parts; now 6¼ parts to 5 parts is sufficient. The third required 7 parts to 5 parts; now 6 parts to 5 parts is sufficient. The fourth required 7 parts to 5 parts; now 6¼ to 5 parts is sufficient. The fifth required 11 parts to 9 parts; now 10 parts to 9 parts is plenty.

You may quite consistently ask at this point, "Should I weigh out the mercury and alloy?—and if so, how am I to know just how old the alloy is and how much mercury should accompany a given amount of alloy?" With increasing clearness we now begin to see that this is one of the complex problems that we have to deal with; that, like a score of other things upon which we are forced to deliberate, the influences which we are using to bring about a certain result do not succeed in the purpose with which they are being concentrated; and that we finally accept an abnormal, unusual, or even undesirable quality of lesser importance to bring about a result which is more desirable when taken as a whole.

We have now seen that the amount of mercury which should be left in the filling is not sufficient to make a plastic mass, and the amount of mercury which will make a plastic mass when the alloy is fresh is constantly changing. With these facts in view there remains but one option for us—viz., to use a generous amount every time, and remove some of it as soon as we have softened the mass sufficiently to enable us to do with less mercury. If we summon our actual observation and experience to a comparison of alloys and their use with other materials and their use, we find not a single instance where appearance, strength, adaptability and stability have been assembled in one material.

In our alloys we add a little zinc in order to improve the color

and to cause the alloy to work better, but in other respects this addition is questionable. There is also a quantity of tin added to make the alloy more plastic, while it is with extreme difficulty that we find tin desirable in other respects. Similar comment may be made in the use of copper and silver. No one constituent seems to possess all the qualities desirable in such a filling material. At present, with our somewhat limited knowledge, we are forced to sacrifice something on some of the properties so that we may improve others. It now becomes imperative that we determine which quality is improved and which injured by what we know to be an excess of mercury, and draw our conclusions as to which quality shall be given the preference.

Effect of Excess of Mercury Upon Various Qualities in Amalgams.—The quality of supreme importance in any filling material is that it shall be free from shrinkage and expansion. As we have just seen, it is indeed a difficult task to furnish an alloy that is absolutely free from movement during the setting process. To be certain that there shall be no shrinkage, most manufacturers market their alloy when it is in a condition to expand slightly, though if it be not carefully made it will even then change enough to shrink slightly in the course of a year or two. We see, then, that we are dealing with alloys which usually expand a little, though we may get one that shrinks a very little. Now, if an alloy expands with a given amount of mercury, what should we expect if we use a little more? We certainly would expect a little more of the alloy to be dissolved, and as a result it would expand a little more, unless the composition has been changed materially.

On the other hand, if an alloy were shrinking, with the proper proportion of mercury, we should expect that, unless certain constituents had been removed, a little more alloy had been dissolved and as a result it would shrink a little more. Experiment after experiment not only proves that the composition is but slightly changed, with the proper manipulation, but our reasoning is corroborated to the letter.

We are, without doubt, safe in stating that, with the class of alloys under discussion, the movement which accompanies the setting process, whether it be shrinkage or expansion, is increased by an excess of mercury and plenty of kneading. In the early part of my work shrinkage appeared to be the only result of any excess of

mercury and plenty of mixing, but the reasons for this soon became apparent when I began to prepare alloys especially for this purpose. Since that time I have found that, while the movement is not quite as pronounced, expansion will be the result if the alloy be really an expanding alloy.

A study of the mass expressed from amalgam during the mixing reveals that portions of the alloy have been carried out with the mercury. It also reveals that certain constituents are carried out in greater quantities than others. These constituents, as we would naturally expect, are the ones which are most soluble in mercury. After an extended study of the mass removed and excess of mercury it appears that the changes produced in the composition of a filling depend largely upon the length of time the alloy is manipulated, though the amount of annealing and the composition modify the change produced considerably.

It seems quite apparent that, if a given change was produced with a given alloy, were that alloy to stand around until it becomes much softer and sets slower by a more thorough annealing, a much greater change could then be produced as a result of this increased softness. On the other hand, if the alloy were one which had been incompletely annealed, it would work harder and go into solution tardily, and consequently less change would be produced.

Any change in composition which affects the solubility of the alloy in mercury, or in the time required for the mass to set, must likewise affect the amount of change produced by excesses of mercury and plenty of kneading. While these are some of the conditions which we are constantly meeting, and which are well worth consideration, I want to call forcibly to your attention the fact that large quantities of mercury have almost no effect upon a given amount of alloy unless the two are worked together. Simply pouring mercury into alloy will not put it into solution, and if the alloy is not put into solution we cannot expect changes in movement, strength, composition, or anything else to take place. It is the working of alloy with large quantities of mercury that produces marked changes. The analyses that I have made show that with a well-made alloy and the proper proportions of mercury, less than 1 per cent of tin has been removed, while with a large quantity of mercury and plenty of kneading about 3 per cent can be removed, the

other constituents remaining in about the same proportions. While we might expect the removal of a constituent whose behavior with mercury was shrinkage to increase the expansion or diminish shrinkage, it does not always work out that way, apparently for the reason that other things than composition control shrinkage and expansion. For this reason many have weighed but lightly the theory advanced by Black, that a formula represented practically nothing, while if they will carry their deliberations to this particular branch of the work they will also find that the removal, with an excess of mercury, of limited proportions of certain constituents is not sufficient to overcome the effect upon shrinkage and expansion produced by other things which help to control the shrinkage and expansion.

With the class of alloys under consideration, we are able with the proper manipulation to develop, when they are new, a crushing resistance of from 400 pounds to 500 pounds on a filling ⅛ inch in diameter and ⅛ inch high. If, however, the alloy be worked with too little mercury, or if it be kneaded only a little, the crushing resistance of the same sized filling may be less than 100 pounds. With a given alloy we may produce a filling with almost any strength by varying the manipulation and percentage of mercury. If the maximum strength of these alloys were constant, if we could expect a filling ⅛ inch in diameter and ⅛ inch high to resist a force of 500 pounds month after month and year after year, we would have little cause to complain about the strength of these alloys.

But, in addition to the changes which take place in the movement accompanying the setting, the percentage of mercury and the time required to set the mass, the annealing produced by the alloy standing around causes a decided decline in strength. Alloys which resist 500 pounds when new will often become so much annealed in one year that 150 pounds to 200 pounds is the maximum strength which can be developed. I have in my possession five or six alloys with which I could make fillings that would resist 450 pounds to 500 pounds eighteen months ago, while now 200 pounds to 220 pounds is the maximum.

While I am led to believe from my observations that alloys get weaker with age, I have nothing to show but that in all cases the strength of the alloy is increased with a slight excess of mercury, provided the kneading be done in the same way as when the right

proportions are used. If we get the alloy when its strength is about 450 pounds we can improve it a little with a slight excess of mercury, and the same is true if we get it when it is a year or two old and resists a force of only 200 pounds.

I do not mean to infer that this is what takes place when large excesses of mercury are used. This holds true only when the amount of mercury used is slightly more than in what we have decided were the right proportions, because there must be friction in the mass.

If each little filing does not rub against the other rather than glide around freely in a large amount of mercury, the alloy will not be sufficiently dissolved to develop strength. It must also be understood that the excess mercury must be removed after the mass has become fine-grained. If the excess be left in the filling and the mass is sloppy while being packed, another condition presents itself—one which, I fear, is of more importance than any other phase of this subject.

On the 19th of January I discussed before the Chicago-Odontographic Society some changes in the strength of alloys which appear to be unavoidable. About one year previous to that time I made two hundred fillings from two of our best alloys. They were made ⅛ inch in diameter and ⅛ inch high, and with the intention of developing about all their strength. Six of these fillings were broken at a time with the dynamometer at varying intervals, from that time up to the present. An average of the fillings thus broken was taken as the crushing resistance of the alloy at that time, and was as follows:

Composition Percentages.

Alloy No. 1.

Silver	68.00 per cent
Tin	26.50 per cent
Copper	4.20 per cent
Zinc	1.30 per cent

Alloy No. 2.

Silver	65.50 per cent
Tin	25.50 per cent
Zinc	3.00 per cent
Copper	6.00 per cent

Crushing Resistance.

Age of alloy.	Alloy No. 1.	Alloy No. 2.
1 day	435 lb.	452 lb
2 days	478 lb.	462 lb
4 days	485 lb.	453 lb
24 days	493 lb.	447 lb
42 days	497 lb.	447 lb
85 days	475 lb.	433 lb
205 days	414 lb.	367 lb
341 days	344 lb.	310 lb
491 days	187 lb.	163 lb

The first thing for us to notice in this connection is that a certain time is required for the alloy to reach its maximum strength. Second, that the period of maximum strength lasts but a short time, after which the alloy begins to deteriorate in strength. When we see that the first alloy had a crushing resistance of 497 pounds, and in less than two years it had one of 187 pounds, and that the second alloy, whose resistance was 462 pounds, deteriorated to 163 pounds in the same time, are we not inclined to ask, Is there a definite crushing resistance to this class of alloys? The question becomes the more forcible when we consider that the alloy deteriorates before it is made into fillings as well as afterward. With these changes going on in the alloy before it is made into fillings, and a similar change going on after the filling is made, it is indeed difficult to say what the effect upon strength of an excess of mercury in the filling is, without stating the age of the alloy before it is made into filling, as well as the age of the filling itself. With other conditions the same, the filling which is packed with too much mercury in it is weaker than one that is packed at just the consistence to squeak under the force of the plugger—a condition which we should not be surprised to find, when we compare it with other materials we handle in which the solvent has been left in excess. A definite relationship between the solvent and the substance to be dissolved also appears to give us a filling more permanent in form than one in which the solvent is in excess, though there must be undissolved material for the excess of solvent to act upon if a great amount of movement takes place. While it is true that changes in temperature often

affect substances composed of materials with low melting points and weak affinities, it has been my observation that undissolved material and an available solvent are capable of producing more change than anything else.

CONCLUSIONS.

The following conclusions may be deduced from the foregoing discussion:

(1) If the maximum strength is developed at the time of making the filling, and the minimum amount of movement obtained after the filling is inserted, it is imperative that the alloy be well dissolved in the mercury.

(2) More mercury than we should leave in the filling should be used to put the alloy into solution.

(3) At no time during the mixing of the alloy and mercury should the mercury be in such proportion as to make the mass sloppy. If it be in such proportion it is said to be in excess.

(4) At no time after the mercury and alloy have been ground in the mortar at least 1¼ minutes and mixed in the hand 1 minute should the mass be so noncoherent as not to take markings of the skin with light pressure. If it is in such proportion there is too little of it.

(5) Alloys of like composition may vary a little in the amount of mercury required, because the annealing and comminution may vary a little.

(6) The amount of mercury advocated by the makers of this class of alloys is approximately correct for one year, providing the alloy has been kept at office temperature during this time.

(7) If the alloy be kept at these temperatures for a longer period than one year the percentage of mercury should be lessened in proportion to the age, or the alloy should not be used—the latter course being preferable.

(8) Large amounts of mercury do little harm to a given amount of alloy if the two are not worked together.

(9) The effect of a slight excess of mercury upon an alloy that shrinks is to increase the shrinking.

(10) The effect of a slight excess of mercury upon an alloy that expands is to increase the expansion.

(11) The effect of an excess of mercury upon change in com-

position is to remove the constituents most soluble in mercury—viz., tin and zinc.

(12) These alloys deteriorate in strength before as well as after they have been made into fillings, hence have no definite crushing resistance.

(13) The effect of slight excesses of mercury upon the strength, whatever it may be at the time of making the filling, is to increase it—assuming, of course, that the excess was removed before packing.

(14) The effect of a slight excess of mercury upon stability is to increase it, if the excess be removed before packing, and to decrease it if it be not removed before packing.—*Dental Cosmos.*

SOLBRIG'S PLIERS FOR THE FUSION OF GOLD INLAYS UNDER PRESSURE BY THE WAX DISPERSION METHOD. By B. Platschick, Paris, France. Many dental practitioners know the advantages of gold inlays. During the past year numerous articles have appeared, both in France and other countries, and numerous communications and demonstrations have been made and given on the subject. It is safe to affirm that a considerable number of the members of the profession are now convinced of the high value of this class of work, perfection in which had not been previously achieved.

To recapitulate what we have elsewhere stated, gold inlays offer the following advantages: Solidity, exactitude in the reconstitution of missing tooth substance, perfect adjustment, good articulation and ease in finishing; and, further, they advantageously replace gold fillings in nearly all cases, and save both operator and patient much time and fatigue.

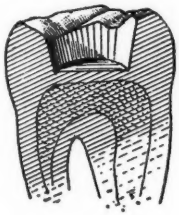
After Dr. Solbrig, of Paris, had introduced, in December, 1906, the idea of the fusion of gold inlays by the wax dispersion method, and after Dr. Taggart, of Chicago, had published, in February, 1907, the marvelous results which can be obtained by the fusion of gold under pressure, the activity of inventors in both hemispheres was intensely stimulated. We may draw attention to the fact that we constructed an electric furnace for fusing gold inlays, which gave excellent results, but which still necessitated the employment of gold or platinum foil for lining the mould. We continued our researches, and had actually constructed a gas furnace for

fusing the gold under pressure by the wax dispersion method, since the non-pressure method previously suggested did not fully satisfy professional requirements. No sooner was this gas furnace ready, however, than Dr. Solbrig brought to the notice of our mutual colleagues, in the course of a recent demonstration at the Ecole Dentaire of Paris, a pair of pliers which is truly a marvel of simplicity, and with which magnificent results can be obtained with the greatest facility. The principle of the pliers is the same as that of our own more elaborate apparatus.

Let us add that Solbrig's pliers, at a comparative small price, enables us to obtain the same results as we can secure with the expensive furnaces constructed for fusing gold inlays, which are somewhat complicated, and so sensitive in action that they are very liable to get out of order, and they quickly deteriorate; and we feel certain the dental profession will unanimously appreciate the excellence of Dr. Solbrig's invention.

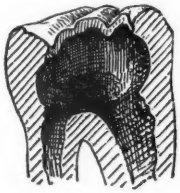
Preparation of Cavities.—Before indicating the operative technique, we consider it useful to recapitulate the general principles which fall within the scope of the preparation of cavities, and for this purpose we will show three typical cases of the character of which all others partake.

FIG. 1.



Cavity prepared with sloping walls.

FIG. 2.



Carious cavity, which extends to the pulp chamber.

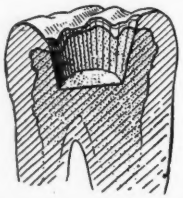
Fig. 1 shows a cavity—not very deep—which is easily prepared without undercuts by slightly inclining the bur when cutting round the walls.

Fig. 2 shows a cavity with very extensive caries, which necessitates the opening up of the pulp chamber. In this case we have

to shape the cavity without undercuts by lining it with cement, as shown in Fig. 3.

The cavity may also assume the form shown in Fig. 4, in which not only the masticating surface, but also the mesiodistal surface is partially destroyed by caries. In this case the cavity ought to be

FIG. 3.



The same, *i.e.* Fig. 2, prepared and lined with cement, the cement being shaped without undercuts.

prepared in such a manner that, although without undercuts, it constitutes a method of retention which offers the greatest resistance to the strain exercised by the antagonizing teeth.

The Making of the Inlay in Wax.—In order to make our explanations clear we will suppose that we have to deal with a cavity such as is shown in Fig. 4. When the cavity is prepared, we have the choice of two methods: The first, of making the inlay in wax

FIG. 4.

Prepared cavity on occlusal surface.

FIG. 5.

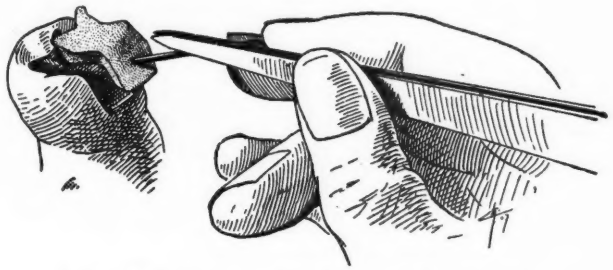
Cavity, Fig. 4, filled with wax.

in the mouth, the second, of constructing the inlay in wax upon a model which is run in an impression cup.

1. When the cavity has been protected from saliva, it is necessary to paint it with pure oil, to fill it with wax (Fig. 5), specially softened over the flame, and to tell the patient to close the mouth in

order to obtain contact with the antagonizing teeth. We then wait until the wax has cooled, or we cool it with a jet of cold water and cut it or diminish it according to our needs. We then take one of the special wire points with the tweezers, we heat slightly one of its extremities, coat it with model cement and insert it in the wax impression at a spot where exactitude matters little. After further cooling with water, we withdraw the wax from the tooth (Fig 6).

FIG. 6.



Shows how the wax model is removed from the cavity

This is done with the greatest ease, owing to the previous painting of the cavity with oil, or to the moisture of the saliva.

2. The second method is mostly adopted because it is the easier, the surer, and gives less anxiety to the operator; moreover, we may consider the work practically done after the impression is taken.

The Taking of the Impression.—The substances which we may choose for taking the impression are wax, guttapercha and Stents composition, but the best of all for nearly every case is Girdwood's Dental Lac, which sets rapidly, is very hard, and yields an extremely sharp reproduction.

The impression may be taken by the usual method known to all practitioners, but we consider it useful to give some hints upon the employment of Roach's special impression cup, which is made of soft metal that can be cut according to the required form and length. It is supplied in different sizes, which are of great service. After having fixed the cup upon the handle, the end of which is split, we cut it to the required shape for taking the impression of the cavity

of the tooth to be filled. We then fill the cup (Figs. 7 and 8) with the plastic material which we have chosen, gently heat the material, press it upon the tooth in question (Fig. 9), and keep it in position long enough for the material to harden.

FIG. 7.

Roach's Impression Cup and Handle with spring slit. The spring slit is shown at the end of the Handle.

We then carefully withdraw the impression from the tooth, detach the cup from the handle by squeezing the spring slit at the end, place it in the lower portion of Ash's inlay ring, in which we have already put the necessary quantity of Moldine or Clayite (Fig. 10, *a.* Moldine or Clayite, *b.* Impression), and oil the impression. Proceeding, we put the top half of the ring in position and pour the model as described below.

The Pouring of the Model.—The model may be poured in plaster

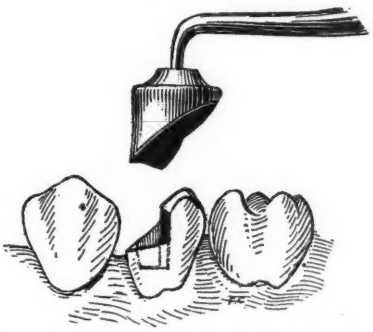
FIG. 8.

Roach's Impression Cup with Handle pressed in the opening in the Cup.

of Paris, but we do not recommend plaster of Paris, because even when it is thoroughly dry and hard it does not possess sufficient strength to bear the pressure necessary for the finishing of the inlay. Spence metal is preferable, and it can be run directly over the impression; it hardens immediately and offers very great resistance to pressure. In employing Spence metal, we heat it in a small ladle, specially intended for the purpose, taking care

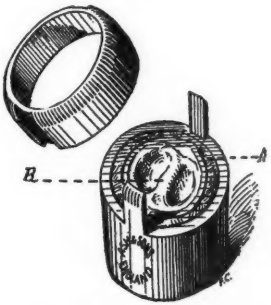
not to let the temperature rise too high and not to wait too long before pouring it, as it cools rapidly. If we find after it has been used several times that it no longer possesses its original fluidity

FIG. 9.



Roach's Impression Cup cut to suitable shape for taking impression of cavity.

FIG. 10.



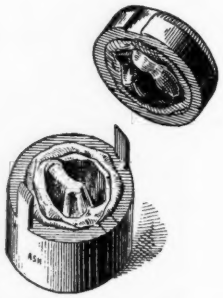
Ash's Inlay Moulding Ring shown charged with :—
A.—Moldine or Clayite. *B*.—Impression embedded in it.

we add a pinch of powdered sulphur in order to restore this quality.

By an alternative method we can fill the impression with amalgam or cement, which is allowed to harden perfectly, and we complete the base of the model with plaster of Paris. The employment of Ash's ring in this case is unnecessary. In all cases we must

take care to soften the impression thoroughly in boiling water before removing the model. Where it is necessary we must see to the articulation and to the contact of the neighboring teeth. To this end

FIG. 10A.

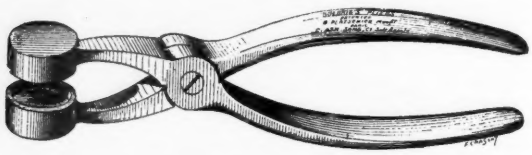


The same as Fig. 10, with the Spence Metal Mould shown in the upper part of the ring.

we put in the tooth a little piece of wax to secure proper articulation, and when we have obtained the needful contact this is put upon the model and enables us to run a counterpart, which, like the model, is mounted upon a little articulator.

Upon the model thus obtained we construct the inlay in wax by

FIG. 11.



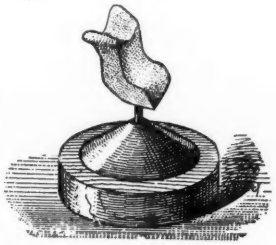
Solbrig's Gold Inlay Pliers, with Cylindrical Chops. One-third natural size

taking the same precautions as in the mouth, and we insert in it one of the wire points at the least important spot. These operations, therefore, are common to both methods.

The Operative Technique.—As will be seen from Fig. 11 the jaws of Solbrig's pliers are cylindrical in form. The lower jaw is hollowed out in such a manner as to form a cup of slight depth

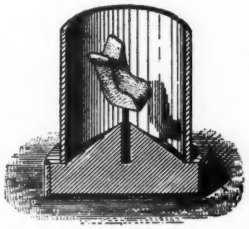
for receiving the cylinder which contains the investment material; the upper jaw is also hollowed out, and likewise forms a cup which is a little deeper than the cup in the lower jaw. This upper cup is

FIG. 12.



Wax model on wire point with free end of wire inserted in centre of cone

FIG. 13.



Metal cylinder placed over cone (Fig. 12).

intended for the reception of two asbestos discs saturated with water.

Preparation of the Investment Material.—The *modus operandi* is most simple. It is of so easy a character that the work can be executed by any dentist and by all workers who have no experience

FIG. 14.

Shows how metal cylinder and cone are secured together with elastic band.

whatever in it, provided they will faithfully follow the instructions given in the following pages.

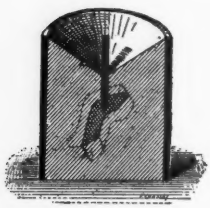
The wax inlay having been withdrawn from the mouth or from the model by means of the wire point held in the tweezers, as already explained and shown in Fig. 6, we place the free end of the point in the center of the cone (Fig. 12), and oil the cone.

We then prepare the investment material by mixing it with water

to the same consistency as plaster of Paris for models is mixed, we wash the wax with alcohol to remove the oil, and paint it with a very fine camel-hair pencil dipped in the creamy investment material.

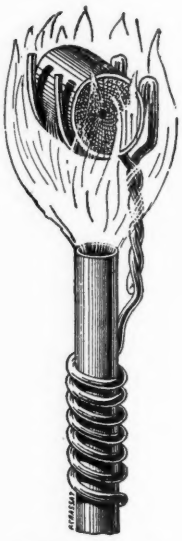
We now place the metal cylinder upon the cone, as shown in Fig. 13, taking care to secure the two parts together with an elastic band

FIG. 15.



Metal cylinder and cone as represented in Fig. 13 are here shown inverted.

FIG. 16.



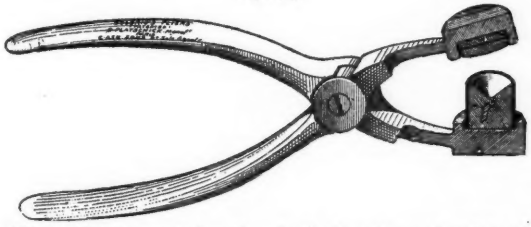
Wire support on stem of Bunsen burner with metal cylinder placed on it.

which we employ as indicated in Fig. 14. We then most carefully pour in the cylinder the investment material to avoid air bubbles. When the investment material is sufficiently set we invert the metal cylinder and cone—see Fig. 15. We withdraw the cone and the wire point, and proceed to the complete drying of the investment material and the burning out of the wax, by placing the cylinder upon the support, specially designed for the purpose, above the Bunsen flame in a horizontal position, as indicated in Fig. 16.

FIG. 17.

Shows how the Pliers are held by only one handle, and how the metal cylinder is conveyed to the lower cup. About one-fourth natural size.

FIG. 18.



Solbrig's Pliers with two asbestos discs in the top chop and metal cylinder in bottom chop. The chops, etc., in this illustration are shown in section. One-third natural size.

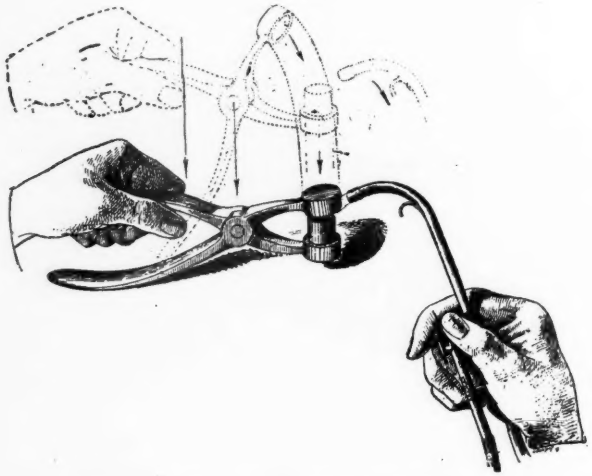
FIG. 19.

Shows how the blowpipe is directed upon the gold in the funnel-shaped opening of the metal cylinder. About one-fourth natural size.

We allow it to remain there for from seven to ten minutes, according to the power of the burner.

Before the seven to ten minutes have elapsed we place in readiness in the upper jaw two discs of asbestos saturated with water (Fig. 18) from which we have gently removed with a piece of rag the excess of moisture. We then hold the pliers with the left hand by the single upper handle, as shown in Fig. 17; we take up the cyl-

FIG. 20.



Shows the blowpipe still in use while the jaws of the Pliers are being closed. About one-fourth natural size.

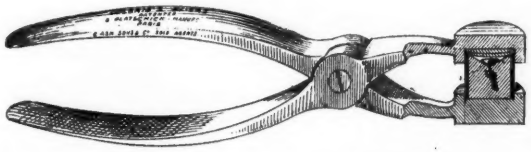
inder, in the special tweezers already mentioned, with the funnel-shaped opening uppermost, and place it in the cup in the lower jaw of the pliers. We now put in the funnel-shaped opening several pieces of 22-carat gold—22-carat is preferable to any other in Solbrig's method of making gold inlays—considerably greater in volume than is required for the inlay under construction, and we are careful to see that the level of the gold when it is fused is a little below the top edge of the cylinder, so that the asbestos does not actually come in contact with the gold before the top jaw of the pliers is closed upon the lower jaw.

On no account must more than two asbestos discs be placed in

the top jaw of the pliers, and the discs must not project beyond the metal.

While the pliers are held by only one handle we direct the blowpipe upon the gold in the funnel-shaped opening until the gold is completely melted and thoroughly fluid. Without ceasing the use of

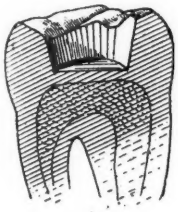
FIG. 21.



Pliers with the jaws shown in section. This illustration gives a clear view of the depth of each cup, of the metal cylinder with funnel-shaped opening, and of the gold to be forced into the mould by the steam. One-third natural size.

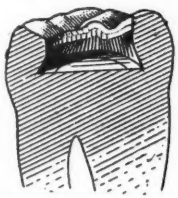
the blowpipe we bring the top jaw of the pliers over the lower jaw by resting the free handle upon the bench and firmly close the jaws (Figs. 19 and 20). The blowpipe is only withdrawn at the last moment, when the distance between the two jaws has become too slight for the passing of the flame. The pliers being hermetically shut and firmly held in this state, the pressure of the steam

FIG. 22.



Shallow cavity prepared with sloping walls.

FIG. 23.

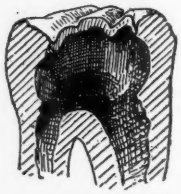


The same (Fig. 22) with undercuts, which are made when the gold inlay is ready for cementing in position.

generated from the moisture in the asbestos discs forces the gold into all the recesses of the mould, and the casting of the inlay is complete (Fig. 21). Still firmly gripping the pliers, we plunge the jaws with the cylinder into cold water. This cools the gold and softens the investment material. We now push the investment

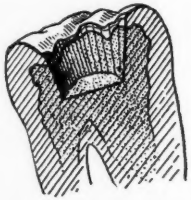
material out of the cylinder, and brush the inlay with a stiff denture brush under water faucet. We then try the inlay in the cavity and satisfy ourselves as regards articulation and adjustment. If all is right, we have only to make the final arrangement for the insertion of the inlay. If we have to deal with a shallow cavity, as

FIG. 24.



Carious cavity which extends to the pulp chamber.

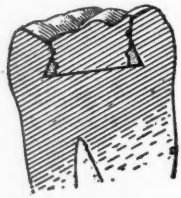
FIG. 25.



The same (Fig. 24) prepared and lined with cement which is shaped without undercuts like Fig. 22.

shown in Fig. 22, we make undercuts in it, as shown in Fig. 23. If we have to deal with a cavity with very extensive caries (Fig. 24), a cavity which we have transformed into one similar to Fig. 25, lined with cement, we remove a portion of this cement in order to give the cavity a more retentive shape (Fig. 26). Finally we

FIG. 26.



The same as Fig. 25, with gold inlay fixed in position and with cement in the undercuts.

make grooves on the inlay (Fig. 27) and produce other means of retention which we may find necessary; or, with the same object, the inlay can be made more or less hollow (Fig. 28) by means of special burs, finally setting it with very thin cement. Lastly,

we polish and burnish the inlay when the cement has completely hardened.

None of the gold inlay work executed up to the present approaches in perfection the work obtained by means of the casting process which we have described in these pages.

This process can also be used in exactly the same way for the construction of other work than gold inlays. As we are unable just now to describe all the applications of this method, owing to the very short time we have had to make the necessary trials, we shall

FIG. 27.

Gold Inlay with retaining grooves round it.

FIG. 28.

Gold Inlay, hollow underneath.

here content ourselves with a brief description of the manner in which gold crowns can be poured by it.

The band having been made, we put it in position either in the mouth or on the model, and reconstitute in wax the masticating surface, according to the principles which we have indicated, by making the wax of the same thickness as the gold is to be. The band with the wax crown is withdrawn from the mouth, or from the model; we prick the wax with a wire point and insert the free end of the wire in the cone (Fig. 12) in such a way that the band is uppermost. We then proceed in the same way as has been explained for gold inlays. In closing the pliers the molten gold is forced into the empty space reserved for the crown of the masticating surface, which is perfectly joined to the band.

Points of Great Importance.—It is most important to note that to obtain the desired results it is necessary

1. To paint the impression carefully with *investment material* before the bulk is poured into the ring.

2. That the drying of the *investment material* by slow heat is thoroughly done, and that the burning out of the wax under full heat is absolutely complete.

3. That the *metal cylinder* is put accurately in position in the lower jaw of the pliers.

4. To put only two *asbestos discs* in the upper jaw of the pliers and to moisten them each time of using.

5. That the *gold* be thoroughly well fused before the jaws of the pliers are closed.

6. That the *asbestos discs* be replaced by new ones when those in the upper jaw of the pliers swell after being used a few times, and extend beyond the edge of the metal.—*Ash's Quarterly Circular.*

SUBSTITUTE FOR THE PORCELAIN FACING IN REPAIR WORK. By J. V. Conzett, D.D.S., Dubuque, Iowa. Crown and bridge workers have always deplored the weakness of the porcelain facing, and although the Richmond crown and the gold bridge with porcelain facings are in many respects the strongest and most satisfactory methods of restoring lost dental tissues, all men who have had much experience with that class of work have undergone the embarrassment, oft repeated, of having their work come back to them after a period of longer or shorter duration, with one or more facings missing.

Because of these experiences men everywhere have been seeking a substitute for the porcelain facing as we now use it, and quite a number have been placed upon the market from which we may choose. Many of these replaceable facings have a great deal of merit and are being extensively used, and to those who find them satisfactory I have not a word to say. Personally, after having tried most of them and having found them wanting in some particular or other, I have gone back to the old method, and in most cases find it the most satisfactory.

My great trouble with the replaceable facings has been the fact that they are not strong enough for the purpose, particularly in cases with a short bite, and I have had more trouble due to the replaceable facings breaking than I had with the facings made from the plain plate tooth.

By reason of the fact that cases from my own practice and those of other men were coming to me from time to time with a broken facing, I was led to find some method of replacing them. I have tried many of the methods described from time to time in our journals, with only partial success, and not at all to my satisfaction,

until I evolved the method I am about to describe, and since then a broken facing has no terrors for me. Although I have never seen the method in print nor have I ever heard of anyone that had used the method previous to my describing it, I do not claim it as original, for it is so simple and at the same time so effective that I have hesitated to publish it because I thought everybody must know of it.

The method I use is as follows: When a case presents with a broken facing, I remove the remaining portions of the porcelain and with a No. 5 "gem" stone grind down the pins flush with the backing. I then drill a hole in the backing the size of a piece of No. 16 gauge wire. If the facing is that of an incisor or cuspid it is necessary to drill through the backing, in which case I countersink from the lingual surface. If in a bicuspid or molar, the depth is sufficient to hold the facing without drilling through. Having drilled the hole, a piece of iridioplatinum wire of No. 16 gauge, suitably threaded, is fitted into the hole, and with a sharp instrument the length of wire necessary is marked upon it. A piece of platinum foil 1/1000 inch thickness is soldered to this wire at the point marked and enough of the wire is allowed to penetrate through to hold the facing that shall be baked upon it. The wire with the platinum foil is now returned to the tooth and the wire is adjusted in the hole, care being taken that the wire goes into the hole sufficiently far. The foil is now carefully burnished to the backing, removed and trimmed, again replaced, and the final burnishing made, when a perfect matrix should have been obtained.

This matrix can now be taken to the laboratory, and any kind of porcelain that is preferred can be baked upon it. I prefer the high-fusing bodies, using first a dark foundation body and filling the matrix fairly full; after the baking the facing is returned to the tooth for a final burnishing, and the enamel bodies of selected colors are applied and baked. If preferred, the matrix can be made of rather heavy gold plate; I have used No. 40 gauge and a low-fusing body for the facing, in which case the matrix can be left upon the facing and the whole thing cemented to place. In using the platinum matrix and high-fusing porcelain it is, of course, necessary to remove the matrix the same as from an inlay. In cementing to place I use a Jiffy cement tube to fill the hole in the backing

and to cover the backing liberally before forcing the facing to place. If it be an incisor or cuspid and it has been necessary to drill through the backing and countersink the hole thus made, the cement should be protected with some metallic substance. I use amalgam, and having all things ready, I mix the amalgam and cement, take a small ball of amalgam and insert it in the countersunk portion of the hole lingually, insert the cement labially, and while holding the index finger of the left hand firmly over the amalgam on the lingual surface of the tooth, press the facing to place with the right hand. The facing is held firmly in place while the amalgam is forced into the countersunk portion of the backing and finished in the ordinary way. A facing can be made in this way very quickly, and with a little practice so accurately as to defy detection. If desired, the hole in the lingual portion can be filled with gold at a later sitting.

I have used this method for about two years, and have yet to report the first failure, but in case failure should occur, the operation can be repeated and the crown or bridge restored to its original usefulness.—*Dental Cosmos.*

A CASE OF CONCEALED OBLIQUE FRACTURE OF THE INFERIOR MAXILLARY BONE. By Otto Plutschow, D.D.S., Chicago. A young man presented himself at my office seeking relief from a severe gnawing pain in the right lower jawbone and cheek, which he attributed to some part of the roots having been left in after extraction. He gave the following history: Three days previously the lower right first molar was extracted, which necessitated the application of the forceps twice. After the extraction the pain ceased almost entirely. But two days after the extraction, toward evening, he noticed a somewhat peculiar sensation in the right lower jaw, which he attributed to the pain from the wound. He was unable to sleep well, and was very restless. By morning the pain had increased considerably. He went to work, but had to quit about noon on account of pain becoming so annoying. He called for treatment at the place where he had the tooth extracted, but was told that everything was all right. Coming home, he applied poultices, without relief. This

night he was unable to sleep, because the pain became so excruciating and neuralgic in character. The following morning he came to my office, and examination revealed the following: The first molar had been extracted, and I thought at first that some fragments of it were left and had caused the pain. I explored to determine whether parts of the roots were left, but with negative result, as the explorer met no resistance, nor was it painful to the patient. The gingivæ near the wound were normal, except where the forceps had slipped and caused laceration. No pus was present. There was slight swelling, there being the usual hyperemic appearance after extraction, showing healthy granulation. Being unable to find any cause, as I had expected, I began with external examination. Patient was in apparently good health, showed flushed appearance on right cheek, with little swelling, but no fluctuation, extending uniformly over right lower cheek, but no discoloration or anomaly or disfiguration of face perceptible. The swelling extended from the angle of bone, especially at the insertion of masseter muscles upward and forward to first lower right bicuspid. On pressure there was pain below the first bicuspid internally, and following down, around and backward, marked about the groove for the facial artery, below the third molar. This attracted special attention, and upon further palpation seemed to notice slight crepitation. I then grasped the jaw by the chin with the left hand to bring it in fixed position, and took hold with my right hand of the angle of the ramus, and then was able to produce a slight inward and outward motion with the posterior part of the angle of the jawbone, producing at the same time slight crepitation. This motion was absolute from the fixed position of the remaining part of the jaw. I then concluded that I had to deal with a concealed oblique fracture, extending from the groove of the facial artery upward, between the first and second bicuspids. To ascertain this, I induced the patient to bite on a small object, which I had placed between the teeth over the fractured area, which produced severe pain. By placing my index finger along the lower ridge of the mandible, I felt distinctly when the patient closed the mouth a sharp edge just before the groove of the facial artery, which edge disappeared when patient

opened the mouth, due to the removal of pressure from above, thus having assured the existence of a fracture.

I treated the case by having the bite closed, fixed articulation, and applying Barton's bandage, to keep the jaw at absolute rest. Nourishment was liquid, and was taken by glass tube, and sodium phosphate and calcium salts administered so as to promote ossification. To prevent any absorption of infectious material along the fold of the mucous membrane or the alveolar process, which might arise, due to the suspended action of mastication, I advised the patient to wash the mouth very frequently with a weak solution of potassium permanganate. Immediately after the jaw was fixed, and motion prevented, the pain slackened and had ceased the next morning entirely, as the constant irritation of the broken fragments was stopped. Ossification had taken place two weeks later, and the bandage was removed.

This case seems to me somewhat interesting, and I bring it to the attention of the dental profession, for it shows how important it is to have our examination extended to the surrounding area, as this or a similar case may come under our care.—*Dental Review.*

WHERE PORCELAIN IS KING. By W. A. Capon, D.D.S., Philadelphia, Pa. Practicing and teaching porcelain in its different phases has been my vocation for so many years that my belief in its superiority is excusable, and as the years advance my confidence in such work is increased rather than diminished.

Porcelain is only king when judiciously applied and its adaptability is wonderfully increased in proportion to the efficiency of the operator, for a few years ago it was advocated for anterior positions only, but its field has increased to such an extent that its use is practically unlimited. Although I am considered a specialist in this work, I still uphold the position I took on this point several years ago, viz.: That porcelain is not a substitute for every filling material in every part of the mouth, but that it is a substitute for gold or any other material when conspicuous or when shade or the tooth structure is endangered by metal. I shall specify with the statement that if the proportion of lost tooth structure is large, just in that ratio is porcelain valuable, which is contrary to the

rule when applied to gold. For an illustration I will take the surface of a first bicuspid. Filled with gold it is unsightly and uncertain, but filled with porcelain it is an ideal restoration without any added difficulty of manipulation in proportion to its increased size, adding to this practically no consideration of pulp complications.

FIG. 2 

FIG. 3. 

FIG. 4. 

FIG. 5. 

FIG. 6. 

FIG. 7. 

FIG. 8. 

FIG. 9. 

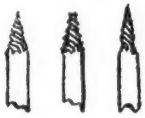
FIG. 10. 

FIG. 11. 

FIG. 12. 

FIG. 13. 

FIG. 14. 

FIG. 15. 

FIG. 16. 

FIG. 17. 

The first principles which gave porcelain its chief value were its esthetic qualities, and after many years of severe tests we have added preservative qualities, which has enhanced its value to such an extent that comparatively all dentists accept it as their permanent filling material. It is at this point where many allow their judgment to be criticised by placing it in the posterior portions of the mouth, with the argument that it is just as applicable there as in any other position, overlooking the fact that in proportion to the diminishing of its esthetic requirements in that ratio should it not be used; for although we have appearance and preservation its power of resistance to force is not increased and the facilities for proper adaptation are decreased and frequently to such an ex-

tent that obtaining an accurate mold of the cavity is an impossibility, therefore it is better practice to use some other mode of restoration.

Porcelain alone is not a tooth-saver, but its value is in the fact that it is a protector for the cement, which is the actual preservative, and it is the general acceptance of this fact that has given an impetus to the extensive using of gold inlays.

I have used them for many years and the simplicity of such operations is a recommendation for their use in molars, as they have a masticating resistance impossible to obtain with a friable substance such as porcelain.

It may be argued that if a correct matrix is difficult to obtain for porcelain it cannot be any easier if used for gold, but that is overcome largely because the matrix becomes part of the metal inlay and assists materially in making a correct joint.

I should like to dwell longer on this particular branch of inlay work, but it is not my present topic, so shall dismiss it by prophesying that in a few years its adherents will be increased a hundredfold.

Porcelain is unexcelled and is the accepted filling for labial surfaces, particularly those cavities bordering on the cervix, and for approximal cavities it is unsurpassed in appearance and durability, but at this point many dentists cease to be porcelain workers. Not from desire, but because of failure or fear of it. Many have asked me the question if I really believed that porcelain corners and tips were reliable, and if my experience has been satisfactory. My answer has been an affirmative one and to you it is emphatically so, for it is in such positions that porcelain is really king over all other materials for the partial or complete restoration of the anterior teeth, as shown in Figs. 2, 3, 4 and 5.

I do not wish to be tedious by entering into technical detail, but a few directions in regard to my means of retention in such cases may be acceptable and profitable. Whenever possible it is preferable that anchorage should be entirely of porcelain, for while pins or staples may assist they invariably decrease the strength of that part into which they are fused. Porcelain in its entirety is a homogeneous mass with the maximum strength that naturally belongs to it, but it is reduced the moment a foreign material is

added, and while porcelain has a greater affinity for platinum than any other metal, it does not lessen the fact that it is still a foreign matter; therefore, knowing this, it is recommended that pins and loops are used only in cases where it is unavoidable and that percentage is probably one-fifth or less. Figs. 2 and 3 seldom require such assistance, and when this is necessary it is in the form of a small pin extending between the enamel plates and as far from edge of porcelain as possible.

In Figs. 4 and 5 a wire staple is almost necessary, and I desire to explain the simplicity of this method and by so doing enable you to practice that porcelain work which is truly the king of dental operations as applied to the nearly natural restoration of broken or extensively decayed teeth.

A successful issue in my mind requires greater exactness and more expert manipulation than any other prosthetic operation.

Porcelain Section Attachment.—Pins from old porcelain teeth can be used without any other preparation, but they are too thick and rarely indicated in preference to the loop or staple, the latter being adapted to almost every purpose and being also easier to manipulate. The tooth is prepared, and a platinum matrix made of the edges and cavity, the thickness the same as in other inlay work, excepting for the cross section of a tooth, when it can be slightly heavier, although I use the same gauge for all such work. The wire being the anchorage, it is unnecessary to cover the floor of the cavity with platinum, therefore breaking the matrix is expected. This being done, take platinum wire, gauge 24, and bend in staple form to fit.

While the matrix is in position, the wire is inserted and held there with paste porcelain made of water and gum tragacanth or mixing fluid. Absorb moisture with bibulous paper or spunk and then gently withdraw the combination from the tooth and after carefully drying at the mouth of the furnace fuse it the same as other work.

These few simple directions will save the time and trouble necessary for soldering the staple and matrix together, and will also insure a purity of porcelain not otherwise possible.

Fig. 6 shows the loops or pins attached in the porcelain and

ready for trial, reburnishing the edges and finishing, as represented by Figs. 7 and 8.

Fig. 9 is a partial section of a bicuspid showing a way of restoring that is most satisfactory. I have made many such cases, and have yet to learn of the first failure. A whole crown is, no doubt, quite as easy to make, but at times a demand for the least loss of tooth makes such a repair desirable.

The building of tips and corners can be more quickly accomplished by using pieces of broken porcelain tooth in the foundation, this allowing a high heat without change in the prominent contour.

About four years ago a firm in London introduced small wedges of porcelain called "Mellersh Mineral Cores," their name being taken from that of the inventor. They are in various shades and will take a high heat without change of form or color. I have used them many times to advantage and recommend them as being of assistance in contouring work.

The Porcelain Jacket Crown.—The jacket crown has done more to show the possibilities of porcelain than anything else, and its stanchness and adaptability cannot be equaled by any one crown or combination of different crowns, and if Dr. Land had never conceived any other invention or improvement he would have done his share toward the betterment of the profession in giving us this one crown, which is the king of them all.

This is an assertion which may be derided by many and accepted by very few. By some it will be attributed to enthusiasm, which is true, to some extent, but it is an enthusiasm born of conviction established by years of practical demonstration and by trials that have stood the test under all circumstances with the most improbable cases—tests so severe that they must be seen to be understood or appreciated.

Many dentists are using this crown, but few have carried it to the success that I know is possible, and it is my aim to teach and write of its merits until the majority are convinced that its field is as wide as is that of the inlay. It has already been made the subject of many papers and has been well described by a few. In a series of articles in the *Items of Interest,* eleven years ago,

I felt that I covered the subject fairly well, but I know that much more can be said and still leave something for others.

A natural interrogation by those who are not acquainted with this wonderful crown is, in what way is it so much better than others that we know are good and which have also been well tested? Replying to this query, I will base its recommendation upon adaptability united with durability, two requisite merits very hard to overcome. But as nothing is infallible in dentistry, it is wise to be ready for trouble, which in this instance may come either mechanically or pathologically. Neither of these troubles need cause despair or much loss of time, for in the former case the most that can happen is breakage of porcelain, and, if the latter condition, all that is necessary is perforation of the crown and drilling into the root-canal, which is a matter of only a few minutes' work; but as these points will be explained in detail later on, I will first speak of the adaptability of this crown.

I have used it in all parts of the mouth and have found that its merits are not limited by position; added to this is the fact that destruction of the pulp is necessary only in a few cases where extreme sensitiveness and the temperament of the patient constitute unfavorable conditions. This crown is particularly applicable to "peg" or "rice" teeth, to irregularity and unnatural spaces, also to cases of extreme abrasion or erosion. In many cases I have used it with splendid success where the root has been split to such an extent as to make extraction apparently the only possible remedy.

It is seventeen years since my first practical test of this crown, and I have many more than a thousand in use; therefore, with so much practice, one must necessarily become expert enough to reduce to a minimum the length of time required to make them. To those thus skilled it is just as easy to make this crown as any other, therefore I apply it in cases where other kinds are just as adaptable; as, for instance, where the natural crown is entirely destroyed, leaving a root flush with the gum. Other crowns can be used in such cases, but my confidence in the jacket crown is so profound that I more frequently use a screw post and amalgam, making a "dummy" tooth. This is especially indicated in bicuspids and molars. I shall, however, be more explicit after a

description of the method of making this crown, which is as follows:

The tooth, or the remaining portion of the tooth, is ground wedge-shape, more labially than lingually, because the porcelain requires more room so that it will be in line with the adjoining teeth, while the lingual portion has only the platinum to be allowed for so that occluding teeth do not strike with any wearing force. The tip is cut off about one-fourth and the enamel line is trimmed at the gum margin with Evans' root trimmers, which are the most efficient instruments on the market for such purposes. (Fig. 10.)

The grinding should be done with good stones of medium grit, using water very freely, and the simplest instrument for this purpose is the glass medicine dropper, although there is a water bulb made for such work, but it is too bulky to always be convenient. The tooth when trimmed and ready for the jacket will appear as in Fig. 11. Thin disks are used to grind between the teeth, making room for the band, also to slightly taper the tooth mesially and distally; but, frequently, cavities on these surfaces will obviate the necessity for this detail.

The next step is to measure the root neck just as if for a gold cap. Instead of gold, platinum No. 31 is used and joints are lapped. Solder with pure gold, using the least amount possible. It has been recommended that a gold and platinum solder is desirable, but I have not found it so and cannot find any advantage in it and it is very much more difficult to flow properly. When the band or tube is made it is fitted to the tooth, and the lingual and labial outlines of the adjacent teeth are marked on the tube as a guide to trim those portions so that they approximately fit the wedge-shape of the prepared tooth. (See Fig. 12.)

Next give attention to the lingual surface, which is ground to the dotted lines on a lathe and then reinforced with platinum of the same gauge. (Fig. 13.) Melt a little gold on the platinum square and then place it in the same position as the cut shows, and the solder will show a shadow as it melts and is a guide as to the quantity and position of the gold. Always grind this section out and do not cut with scissors, because one method gives a broad surface of attachment and the other gives only the thin edge of metal, which weakens as it takes the furnace heat.

The edges of projecting platinum are then ground even with the tube surface (Fig. 14) and then the labial or face side of the tube is ground thin to the marked line. This is the most important part of the work and probably the most difficult, for the reason that we require a surface sufficiently thin to burnish to the natural tooth, and, if the part is torn or ground through, it lessens the porcelain attachment proportionately. This being done, and the tube fitted on the tooth, it will resemble Fig. 15, which only shows the outline of the corrugated front. The tongue on the incisal edge may be noted, for this is the secret strength of the crown and cannot be seen after it is made. Press the front of metal to place with a blunt instrument with the object in view of making it irregular and better adapted to secure porcelain, and the little tip of metal on lower edge is made by pressing it against a revolving stone which turns and gives it a thin edge in the same movement. After the metal cap is made and before fitting put it under the blowpipe and anneal it, also removing any platinum grindings there may be.

The crown is then ready for the porcelain front, which is a thin veneer made for the purpose. This veneer or facing is ground thin and fitted approximately and is attached by means of porcelain body mixed stiff with mixing fluid, which is forced into every part offering attachment and especially between the tooth tip and the metal point, also into any depression caused by cavities. The veneer is put into position and tapped into place, and the whole is withdrawn with pliers, excess of porcelain removed, and then dried carefully, face down, on a tray in front of the muffle. It is then gradually pushed in and the heat raised to the fusing point, then placed in a cooling muffle until thoroughly cold. The crown is then tried on, and if too full cut from the face and add more body where required and finish, placing the crown on the tray, face up this time, heating and cooling carefully as before. The platinum is polished with sand-paper disks and the crown permanently placed with moderately thin cement, appearing then as in Fig. 16.

One of the most important considerations in making this crown is to note the bite, not because another crown would give better results in certain cases, but because the occluding teeth will be a

guide in the making, for certain changes are made in form and material that are of much value. For instance, I have described this crown as being made of platinum, and generally that is the metal employed; but there are places in which its combination with iridioplatinum becomes advantageous and sometimes again the whole metal part is made of iridioplatinum. This harder metal is used on the lingual surface whenever there is very hard contact or a liability to unusual wear, as in a case of a "close bite." When the incisal edge is in direct contact it is advisable to carry the metal to the edge, bending it at the cutting edge to take the force of the bite and have the porcelain anchorage entirely on the inside. (See Fig. 17.) In fact, many follow this method in all cases; but the porcelain tip is equal in strength and neater in appearance.

It is claimed by some dentists that it is an advantage to have the whole metal portion iridioplatinum, as its stiffness allows the use of a lighter gauge. This is true when the work is applied to lower incisors, because of their usual closeness, but this combination metal is very intractable and brittle. Even with much experience it is difficult to grind it thin without breaking and its harshness prevents neat adaptation, as compared with pure platinum. I, however, advise the use of all iridioplatinum if the crown is to serve as an abutment either for a porcelain or a combination gold bridge. It is not generally known that jacket crowns can be used in connection with a gold bridge. This, however, is recommended, for they can be invested and soldered just the same as a porcelain attachment, by means of pins.

Repairing a Jacket Crown.—The repair most likely to be needed is reattaching a veneer. This, if not well attached, generally comes free from the metal, but if the metal tears away with it a new crown must be made. If the framework is intact and firm in place, loosen all the free edges with a thin, sharp, flat instrument, getting out the cement as much as possible and then use an old scaling instrument as a hook at the neck, and in many cases the frame will come away, and with a little straightening be as good as ever. Sometimes a pair of pincers nipping the free point of the platinum will draw it off when other means fail. When removed, clean all the cement out of it and put under the blow-

pipe, making it clean for new porcelain. If the same veneer is used all of the old porcelain should be ground away and the metal framework be put in front of the furnace for a few minutes to burn out any impurities; then proceed as if the crown were new. The time usually consumed for this repair is an hour.

An unusual cause making repair necessary is the cutting away of the lingual surface of the occluding teeth. I have several cases which have required this mending after several years' use and in every case the porcelain was intact. If they are worn sufficiently to be easily taken off, clean out the cement, burnish thin platinum or gold foil on the tooth where the cap has been worn through, replace the crown and attach the two with wax; then withdraw them and invest. Solder with 21 or 22 k. gold, and recement the crown. It will be none the worse for the repair and will probably last many years longer if ordinary care is given in the soldering process.

Treatment of a Root Through a Crown.—The jacket crown, being hollow and having a thin metal back, provides a ready means of access to the pulp canal; this is a point in its favor, particularly to those who claim that a crown capped will surely give trouble unless the pulp is devitalized. Using a crown of this description, therefore, will demonstrate pulp vitality, and when treatment is necessary lessen its difficulties.

The essayist's experience has proven conclusively that healthy pulps will live indefinitely with the tooth ground and covered as heretofore described, and that only a small percentage of teeth covered with this crown require treatment from any cause. Of course a degenerate pulp will die and require treatment, and so trouble will occur with crowned roots, and a provision for their eventual healing is good practice. The non-sensitiveness of some teeth, particularly those that have had much filling, is very delusive and frequently every preparation for crowning has been balked by the discovery of a living or putrescent pulp. In some instances the delay caused by the necessary treatment of a multirooted tooth causes serious embarrassment; but the employment of this class of crowns relieves us of worriment from this cause, for in either instance the tooth can be finished without delay, as treatment of the canal can be resorted to by boring through the platinum of the

lingual surface, the opening being finally finished with amalgam, to match the metal, or by gold, if preferred.

Porcelain Veneers.—For several reasons, the use of thin porcelain veneers, made especially for the work, is recommended. They require little change of form, and the shading is more accurate and less liable to change than in a tooth ground for the purpose. As they are inexpensive, a considerable number can be kept in stock, which is a convenience and also a saving of time. Plate teeth are frequently employed and a few contend that there is no disadvantage in their use, and that is true so far as the porcelain is concerned. The disadvantage is that the porcelain tooth must be ground thin and every particle of the pin must be ground out, otherwise there may be a check in baking. Now if the shade is correct before grinding, how is it possible for it to be so afterwards, when the flat side or groundwork of the tooth, which governs the shade, is taken away? To retain the shade the tooth must be ground equally on both sides; this reduces accuracy of shade to guesswork. Then, too, the pinheads are sure to be left in the porcelain unless they are drilled out with a diamond drill. We all know that grinding is tedious, and if the work is placed in the hands of the laboratory student the chances are that the result will be unsatisfactory. A further consideration is the fact that in using teeth the various products of different manufacturers act differently in refusing. This matters little if the face of the tooth is left intact, but if it is ground and given sufficient heat for reglazing, the result sometimes is different. There is also the further fact that some teeth require so much greater heat to regloss than the uniting body requires for correct fusing that the latter has lost much power of attachment in the process. I therefore recommend the use of veneers made for the purpose. They are of all sizes and shades and arranged in twos, four or sixes, with the addition of bicuspids. —*Pacific Dental Gazette.*

SWAN SONGS AND DEGENERATION OF AMERICAN DENTAL COLLEGES. By Eugene S. Talbot, M.S., D.D.S., M.D., LL.D., Chicago, Ill. "There is a class of men," Macaulay remarks, "who have not that amplitude and intrepidity of intellect which it is the first object of education to produce. They hate

abstract reasoning. They think that the use of experience is not to lead men to the knowledge of general principles, but to prevent them thinking of general principles at all. They play at bo-peep with truth, but never get a full view of it in all its proportions." This class of men are peculiarly apt to chant the swan songs of senile decadence. The swan, according to the old myth, when about to expire of senility, sang for the first time. This song is that which marks many of the defenses of dental education.

These ideas were developed a year ago from a discussion of "Errors in Dental Education." The subject of the paper was "Are Dental Colleges Degenerating?" leaving the question an open one. Since that time, enough has been uttered by men connected with our colleges to warrant changing the subject to the more positive one—"Swan Songs and Degeneration of American Dental Colleges"—and rewriting the paper based upon these remarks.

To those interested in the progress of American dental education, the contrast of methods of instruction between medical and dental colleges becomes more and more apparent. The question of the American dental college degeneration naturally presents itself.

Evolution and degeneration go hand in hand, and depend on each other. Evolution insures new development suitable to environment, but degeneration halts and discards specialization; it ceases the advance and retrogrades. In discussing this subject I have no animosity toward any teacher or school. Being a teacher myself is my excuse for showing up these glaring defects. My aim is to see dentistry placed, scientifically, coequal with other specialties of medicine.

When the first dental school was founded, extraction of teeth, insertion of artificial dentures and repairing decayed teeth constituted the bulk of dental practice. The dentist was essentially mechanical. On this ground the medical faculty refused to recognize the specialty, and the dental school was established. This tendency, together with the animosity engendered in the minds of those early teachers toward the medical profession and *vice versa*, completely divorced dentistry from the mother profession, producing a mechanical specialty. This idea still exists in the minds of a few dental teachers.

In the relation of dentistry to medicine little or no progress has

been made since the establishment of the first dental school. Many teachers of dental schools discourage every suggestion or tendency in this direction, purely from a commercial standpoint, regardless of the fact that our knowledge of dental pathology has been developing for more than twenty years along the lines of general medicine. True, dental colleges have established chairs of anatomy, physiology, chemistry, materia medica, etc., but mechanical dentistry so far overshadows the biologic side as to make it practically useless to the student. Some teachers claim it is needless to give the dental student as complete a course as the medical student, hence these departments in many schools are of little value. There are schools—so-called dental departments of universities—in this country where the very atmosphere, from the dean to the janitor, is mechanical. Students attend the lectures on medical subjects merely as a matter of form. So defective is this method of teaching in dental schools that the National Association of Medical Faculties has refused to credit a graduate of dentistry with one year toward a medical education.

The president of a large university with a dental department said a short time ago in the presence of its dean and members of its faculty, while discussing the needs of the department, "Your school is nothing more than a school of mechanics." Like all mechanics, dental mechanics are limited. The inventive mind took but few years to provide all needed improvements along these lines. The highest development was attained more than thirty years ago. Since then but few good and permanent ideas have been evolved. Dental offices are filled with worthless appliances. Teachers have been content to drift on this narrow conception of dentistry and have not kept pace with scientific advance. Their lack of judicial culture prevents the adoption of newer, broader and better ideas. In an interview with one of our best dentists—a man sixty-six years of age and a teacher—a disease of the mouth and teeth was under discussion. He took the ground that Dr. A's theory was correct. "But," I said, "have you seen the models of Dr. B? These show that Dr. A's theory cannot possibly be correct." The dentist replied, "Away with Dr. B! Dr. A is a friend of mine and I shall advocate his theory." So ignorant are many of our graduates and teachers of logic that they are guided by likes and dislikes of the author rather than by the value of their

researches. Some teachers are ignorant of the value of research in dentistry, although its importance as a fundamental factor of advance is well recognized in other departments of biology. So careless and indifferent are these teachers that exploded doctrines are taught to the students every year. A large per cent. of the theories taught are of no account, and could easily be dispensed with.

Students are drilled in mechanics and commercial dentistry, while the important subjects of etiology and pathology are given practically no attention. The analytic powers of the graduate have thereby been arrested in development, and he becomes narrow-minded. His college training does not even lay the foundation for improvement after he begins practice, so he dwindles into an apathetic so-called professional man. He can but rarely explain or give sufficient reason for cause and effect when questioned by patients, so narrow has been his education. Guilford says, "More than once have we heard from the laity the expression, 'Dentists are nice people, but they are narrow.' The remark carried a sharp but unintentional sting and it was all the more irritating because it was more than half true."

Dentistry has drifted along for the past thirty years until it has reached the parting of the ways, where it must remain mechanical or take a broader scope. This narrow teaching results from ignorance of the simplest forms of disease. Years ago it was shown that modern mechanics was producing more disease than any one natural cause, yet no attention was paid to this warning by the teachers. Instead of looking forward, and being alert to anticipate disease and teach pathology, teachers studied and formulated swan songs to hinder progress along these lines. However, not all teachers are of this turn of mind. There are some who would progress and place their colleges on an advanced plane. The majority, however, for commercial reasons, would keep dental colleges at the low standard which they now occupy. One evidence of this statement is a return from a four to a three years' course of instruction.

You ask, "What is a swan song?" It is the cut-and-decadent answer to any question that may be put to a teacher of a dental school in regard to improvement or advancement in dental teaching, and is intended to squelch further discussion along dental lines. Some of these swan songs are exaggerations. They have

been very successfully sung in exhibiting the degeneration of dental schools for these many years.

This paper is intended to answer some of the swan songs, and offer suggestions from the writer's viewpoint.

One of the oldest swan songs, sung in dental societies for thirty-five years (see proceedings of dental societies), is in answer to the problem of literature. They answer they are too busy and too tired at night to do much work. This song is still sung today. No class of men are busier than physicians and surgeons, and yet they find time to read, write and make researches.

Books on other specialties of medicine sell in editions of from 12,000 to 50,000, while in a large majority of cases not enough dental books are sold to pay for the binding. In some cases not a single book is sold. It is difficult to induce a publisher to issue a dental book for the same reason—dentists are too busy or too tired to write papers or read. It has been known for many years that the majority of dentists do not take or read dental journals. The dental goods houses are obliged to advertise their wares. To get their journals and advertisements before the profession they have been obliged to reduce the price of their journals to one dollar per year. A journal half filled with advertisements appeals readily to a majority of dentists. A non-trade journal cannot exist in America. The bookworm has become hereditary, its nidus having become deep-seated in the dental faculty.

In the October, 1907, *Dental Cosmos* there is an editorial entitled "The Position of Dentistry." On page 1095 is the following: "We have always and consistently maintained that in education as well as in physics, and even in morals, the shortest distance between two points is a straight line, and that therefore the best way to educate a dentist is to teach him the things that a dentist needs to know and to do, as broadly and as thoroughly as may be possible—which is the principle in successful operation today in dental education."

The editor then advocates the narrow dental teaching which has been characteristic of the dental schools from the first. The incongruity of the entire argument is shown by the editor himself, in an appeal to the profession at the end of his editorial, in which he makes a plea for one hundred and fifty more subscriptions to Guerini's dental history. Seven hundred subscribers are now re-

quired before the work can be published. Think of only four hundred subscribers to this valuable work out of 30,000 dentists in America! Certainly the material which enters the dental school is as good as that which enters the medical school. The product from an educational point of view, however, is quite different. The last line of the quotation of the editorial is answered by Dr. James Truman in his article "Wanted—A Pathological Sense." (DENTAL DIGEST, September, 1907.) He scores the dental practitioner in the following manner: "The man with a clear pathological intuition is seemingly a rare production in our ranks, if we are to judge by the serious mistakes presented in almost every line of dental operations." Dr. Truman is forgetful of the fact that the poor fellow was induced to enter the dental college, from the farm or abroad, with the assurance that he was to obtain an education "by the shortest distance between two points," sufficient to enable him to practice his profession with a reasonable amount of skill. Why score the product? The best seeds, sown in poor soil, can rarely bring forth good fruit.

The graduate on entering practice soon finds that the "shortest distance between two points" in dental training does not fit him to practice the pathologic side of his specialty or to understand cause and effect.

The shortest distance between two points as practiced by our dental colleges does not give time to teach students honesty in giving credit to those who have done original work, or how to write papers—which is made so much of in medical colleges—or to do original work, which is the vital point in all medicine. The average dental teacher is anxious and willing to adopt this shortest-line business, to do as little studying as possible, and to get through his course as soon as possible. This being the case, the student becomes deficient in not being able to find time to study, write papers, or do original research work.

A swan song, sung for many years, is that medical graduates never make good dentists, that a medical education does not fit a student to practice dentistry, and that the better educated a student is, the poorer dentist he becomes. The men who advocate these doctrines claim that this has been their experience. If that is really the case, why do they admit medical graduates? Why do the teachers encourage such students to spend their time and

money to no purpose? Do they not know it is dishonest to take these fees, if the student—according to their doctrine—will not make a good practitioner of dentistry? The young man who is so unfortunate as to graduate in medicine or obtain more than an ordinary education will certainly have a hard time making a living if these doctrines be true. In answer to these utterances, I have only to call your attention to the two able editorials in the August and September, 1906, DENTAL DIGEST. It is possible that some of the medical graduates who have come in contact with these teachers have made failures in medical practice, and would fail in every professional calling. We are familiar with cases in which graduates of medicine and dentistry have been obliged to drive street cars, work upon farms, and perform other manual duties, having missed their calling along professional lines. In some cases they have acquired reputations in their new employment. It has been shown that fully fifty per cent of graduates, in both medicine and dentistry, are failures as practitioners. This must have been the class of medical graduates who have applied to these teachers in dental schools. To say that a young man who wishes to make dentistry his calling should not study medicine first is untenable. Most young men who have chosen dentistry for their calling, and have preferred to graduate in medicine first, have made good practitioners.

It is a notorious fact that, from the first, the dentists who have accomplished anything in their specialty, such as writers, investigators, authors, teachers in colleges, etc., have been medically educated men. The men in the future who are to make progress in our specialty must be graduates of medicine, as well as having had special training.

Another swan song is that it would require seven or eight years for the student to graduate in both medicine and dentistry. Because of the time and money required, students would not submit to the outlay. In answering this question, I would say that both were successfully studied, and students graduated with high rank in both schools, by combining the two in four and five years under Dr. George V. I. Brown's supervision in Milwaukee. The same was true under Dr. W. X. Sudduth's administration at the University of Minnesota at Minneapolis. What has been successfully done in one or two schools can be done in all if the teachers are

so disposed. In most cases the students can obtain both degrees in five years. This requires no longer time or more money than other specialties require in post-graduate work. No dental school turns down a graduate of medicine, thereby losing two years' tuition fees, no matter what the age of the applicant.

A swan song always appreciated in dental societies is the required early training of the hands for manipulative skill in the mechanics of dentistry. A candidate for dental preferment must begin early to acquire the "touch system," therefore he has not the time to study medicine or to study it in connection with his specialty. I answered the first part of this question in my article on "Errors in Dental Education." There are, however, one or two points in answer to this question not touched upon. No dental school turns down a candidate because of age. Many students enter from twenty-five to thirty-five. I knew one man who entered at fifty-five. Certainly the "touch system" is not considered at matriculation, except in so far as the money is concerned.

The theory so successfully advocated by the profession that the student must begin early to acquire manipulative skill as an excuse for ignoring entirely, or postponing, the study of the biologic side of dentistry, is not borne out in other departments of medicine. After years of thought and study the best schools of medicine in America are requiring an academic degree as a part of medical training. The first two of the four years' medical course are devoted entirely to the general study of biology before the student is permitted to apply the knowledge thus acquired in practical demonstration. All medical schools must adopt this method of study. Certainly no hand should be more skilful than that of the surgeon. Dental schools must sooner or later follow this method. How can a student do practical demonstration successfully without first knowing something of what he is doing? How much time can be saved? The mechanics of dentistry and the commercial spirit, which are the most prominent features of our dental teaching, will, in a measure, be diminished, and the professional spirit so necessary and so much desired in our specialty will predominate.

A swan song, stifling further discussion and sung with expanded chests at the present time, is relative to the question of a proper dental curriculum (see current dental journals). The reply is

that the medical profession, high schools or some other institutions of learning do no better, and perhaps worse, than our dental schools. Because one individual or one institution is faulty is no criterion for our shortcomings. Such delinquencies in other institutions should spur us to greater activity and better work. Having our faults pointed out, we should have ambition to overcome them, and strive to push forward to a higher plane, regardless of the faults of others.

One of two things is at fault: Either the governing bodies of dental colleges are ignorant of the requirements of graduates and their patients, or they wilfully and maliciously—for commercial reasons—keep them in ignorance of the very essentials necessary to successfully treat pathologic conditions of the mouth.

A new swan song popular in dental gatherings is relative to the merits of the medical and the dental graduate. This song commences with: Professor So-and-so (naming a prominent medical teacher) said that he considered the dental graduate far better qualified to practice his specialty than the medical. This song is sung with considerable vigor at the present time, because it means much to the dental college and to the new student. The inconsistency is shown in discarding an old and familiar tune sung since the first dental college started, namely, that "physicians know nothing about dentistry." At first thought this new song sounds plausible. When, however, the question is asked, What is, or should be, considered dentistry? the song is worthless.

If dentistry consists of extraction of teeth, making artificial dentures, crown and bridgework, gold and porcelain inlays, fillings, etc., there is no question that the professor of medicine is correct. If, however, dentistry consists of the etiology, pathology and therapeusis of diseases of the mouth, plus the crown and bridge work, etc., then the professor does not know what he is talking about, and the olden song is again sweet to our ears. The teacher singing this new song is ignorant of the requirements of the graduate.

In a *Cosmos* editorial (September, 1907), "It Hath 'a Very Ancient and Fishlike Smell,'" the writer takes to task the daily papers of Minneapolis announcing the opening of the meeting of the National Dental Association. These papers printed in large bold-face type, "Tooth-Pullers Open Convention." Are we

not "tooth-pullers," "tooth-carpenters" and "tooth-plumbers?" Have we not come justly by the title? The owner of a piece of property, when parts get out of repair, sends for the carpenter, plumber or roofer, as the case may be. Is not this precisely what the dentist does, the only difference being that instead of the artisan going to the property, the property goes to the artisan for repairs? Do colleges teach anything but repair work? Are we, as graduates, qualified for other than repair work? Everything taught and practiced in dental schools is the restoration of the ravages of decay and destruction. Not a suggestion is made, by teachers, in the form of preventive medicine.

Dr. Kirk, in his editorial on "The Position of Dentistry," says: "At various times and in many places debate has waxed warm over the discussion of the theme—'Is dentistry a specialty of medicine?' and the opposing views held by the disputants as to the principal premise and its various applications to the question of dental education have served to divide the dental profession into distinct parties, the major one contending for the separate and special training of the dentists, and the other, a small minority, demanding a medical training and medical degree as the only adequate preparation for dental practice."

Dr. Kirk, in his enthusiasm for discussion, has, evidently unintentionally, misrepresented the views of the "small minority." In thirty-five years' of experience in association with stomatologists throughout the world, I have never heard one statement or hint that "a medical training and medical degree is the only adequate preparation for dental practice." All stomatologists agree that dental college teaching is one-sided; that mechanics have been developed at the expense of biologic training. Since an attempt is made to teach biology, graduates of medicine are, in most cases, employed for that purpose. A better knowledge of these subjects can be obtained in a medical school, as it is better equipped for such teaching.

During the singing of the swan songs, while the deans and the teachers are at their wits' end keeping the profession in ignorance of their duties to their patients, the "still small voice is heard" hard at work developing and broadening principles of dental practice. While it is true dental colleges have been and are graduating men—"the major part contending for the separate and spe-

cial training for the dentist"—ignorant of their duties to their patients, there are a few—"a small minority"—who demand a medical education in connection with dental training and who will be able to take a broader view of pathology and to render better service to their patients. The Pilgrim fathers were small in number, but their cause was a just one. It took years of hardship and toil to accomplish their object, but the results were wonderful. Being on the right side of the question is more than half the battle. The "small minority" have been working quietly but steadily for the object they have in view, while the "major one" has been singing swan songs and beating drums to draw the attention of the profession from the gradual development of the minority to "schools of mechanics" and "diploma mills."

This state of affairs cannot last. If dentists will not demand a better training for dental graduates, which all know to be necessary, then patients themselves will seek those men best qualified to diagnose and treat diseases of the mouth, jaws and teeth, and the "tooth-carpenter" and the "tooth-plumber" will soon find their level. A new era has already arrived. The public has been educated and the people are beginning to discriminate between the "tooth-carpenter" and the stomatologist, and in this manner a better education will be demanded of our teachers.

To show that some progress has been made by the "small minority," I have only to call attention to the splendid work of the Section on Stomatology of the American Medical Association in the past twenty-six years; the formation of a similar section in the British Medical Association three years ago; the two very successful and satisfactory meetings in Paris this summer, namely, the First French Congress of Stomatology, in which over four hundred were present, and the formation of the International Association of Stomatology, composed of over two hundred delegates, and the high standard proclaimed for the Section on Stomatology of the International Medical Congress. Last but not least, the advancement proposed by the Royal Dental Hospital of London, as to which I quote the following:

"The Royal Dental Hospital, with its connected college, held its annual dinner on November 23, when Mr. Lloyd Williams presided over an assembly of about one hundred and sixty persons.

In proposing a toast to the institution, Mr. F. G. Hallett, one of the guests of the evening, drew attention to the alterations in the regulations recently made by the College of Surgeons in regard to its diploma in dental surgery. The reduction of the period during which a student should devote himself to mechanical dentistry from three years to two was an advantage, as it left him more time to acquire knowledge of the scientific side of his future profession, and the work of the four years' curriculum was thus better distributed. In the course of his reply on behalf of the institution, Mr. Colyer remarked that in establishing a clinical laboratory and appointing a clinical pathologist it had once more taken the lead and set a desirable example to corresponding places of study. Mr. Lloyd Williams, who proposed a toast to past and present students, expressed an opinion to the effect that dental surgery was passing through a critical period, and urged all to combine in an endeavor to secure its proper position among the professions. Just as in the case of surgeons, painters and sculptors, mechanics entered largely into their work, but nevertheless the practice of dentistry remained a profession—an art and not a craft. The formation of a dental section in connection with the Royal Society of Medicine was a step in the right direction."

Lack of funds is an excuse for want of better teaching and special teachers for special subjects. If teachers already employed were required to be masters of the subjects taught by them, a better educated class of students would be graduated. Teachers of every department should be required to investigate all new ideas and teach those found to be correct. The medical profession is ever alert to any suggestions that will lead into broader fields of knowledge, and these new fields are thoroughly investigated in laboratories until little by little the etiology of disease is demonstrated. Not so with dentistry. Dental teachers, from a lack of a broad general knowledge of their specialty and of modern researches, are unable to grasp new ideas or discriminate between the wheat and the chaff. The result is that dentistry is not making modern scientific progress, and special teachers for special subjects are, therefore, considered necessary.

There are other swan songs to be discussed later, though enough have been quoted to make the point desired in this paper. These

swan songs are sung in season and out, at logical and illogical moments, and always for one purpose—to draw the attention of the person or persons from the real question at issue, namely, the better education of the dental student to fulfil his duty toward his patients.

As I have already remarked, we have arrived at the cross-roads in the teaching of our specialty. We must decide whether our dental schools shall remain "schools of mechanics" or broaden out and include biology.

Two roads may be selected; both are easy of travel and both will arrive at the same Rome. First, let the schools remain "schools of mechanics." The teachers, for this purpose, are ideal and the schools all that could be desired. Since subjects in biology are taught mostly by medically educated men, often their departments are merely nominal and considered of little consequence in dental colleges. As money for the equipment and proper education seems so necessary, let the student first obtain his medical degree and finish his two years in a dental school. This has been successfully carried out in this country and Europe. Second, let the dental and medical schools unite, making no distinction between the students. Give the dental student two years' dental training and let him graduate with both degrees. This will require four and possibly five years. If five years should be required, it will take no longer than it does other specialists before they can begin practice.

As previously stated, every line of thought or science is unstable. It will stop development and degenerate or it will progress and evolute. The study of so-called dentistry will, thank God, evolute. The requirements of our patients demand this, though the mechanics and commercial men in our dental schools have, by their swan songs, temporarily retarded evolution. The day is fast approaching, however, when they will be required to place their houses in order; and while American dental schools and methods have, in the past, led the world, our European *confrères* are now about to take the lead. Agents of American "schools of mechanics" cannot regulate the standard of dental teaching in European countries. Why cannot American teachers read the handwriting upon the wall and place their schools in the

highest possible ranks, thereby retaining the prestige already acquired?

I cannot close this paper better than by quoting from an address of Owen Wister, on "Our Country and the Scholar" before the Harvard Association at Cambridge, Mass. He says, "If American scholarship [dental teaching] is to attain any luster, the college bird of paradise must become the bird of midnight oil, and the bird of midnight oil must come out into the light and get some fresh air."—*Dental Cosmos.*

"DR. TALBOT ON DENTAL EDUCATION." An Editorial in Reply by Dr. Edward C. Kirk. In our previous issue we published a paper by Dr. E. S. Talbot entitled "Swan Songs and Degeneration of American Dental Colleges." At the outset of his presentation the writer defines his motive by saying, "In discussing this subject I have no animosity toward any teacher or school. Being a teacher myself is my excuse for showing up these glaring defects. My aim is to see dentistry placed scientifically coequal with other specialties of medicine."

In discussing this paper by Dr. Talbot the motive of the editor of the *Dental Cosmos* is precisely analogous, for being a teacher himself and being also desirous of seeing dentistry placed scientifically coequal with the other specialties of medicine, this is likewise his excuse for "showing up these glaring defects" in the general indictment of dental education made by Dr. Talbot in the article under consideration.

It would seem to be rather a hopeless task to attempt to deflect the viewpoint of a dentist who is dominated by the obsession that his professional colleagues—or, more properly, his fellow craftsmen, as he apparently regards them—are "tooth-pullers," "tooth-carpenters" and "tooth-plumbers," who have justly come by these titles because the only difference between the dentist and the carpenter, plumber or roofer is that in the case of the dentist the "property" (patient) goes to the artisan for repairs, whereas in the other cases "the artisans go to the property." Well, let us, in passing, be humbly thankful for this admission that there is at least some difference, small though it be.

The whole article strikes us as being a biased and, therefore, injudicial treatment of the subject, wrong in its main premises, in-

correct as to much of its data, and necessarily faulty in its conclusions. It contains some truth and much error; just enough of the former to give it a certain plausibility, an element of verisimilitude, which is superficial and misleading, so that to anyone having a fair knowledge of the facts it is evident that the paper is very strong in weak points and equally weak in strong points.

Dr. Talbot has been a voluminous contributor to the literature of biologic science in a variety of its phases; he has become well known as a gatherer of biologic data and as an exponent of certain fundamental doctrines generally held by workers in that field. Especially is he known in dentistry for his painstaking endeavors to apply to the study of the problems of dental pathology the larger generalizations of biologic science. For this work, and for his earnestness in emphasizing the necessity for a better and more general understanding of these scientific generalizations among dentists and teachers of dentistry, he has earned and well deserves the gratitude of all who, like himself, desire "to see dentistry placed scientifically coequal with the other specialties of medicine." But earnestness of endeavor, even when coupled with high moral purpose, is not necessarily the guaranty of human infallibility; indeed, these very qualities tend rather to magnify the effect of errors of judgment when upon occasion the possessor of these admirable attributes actually does fall into error.

In the present instance the error of Dr. Talbot, as we view it, is that he has seen only the degenerate end of the educational proposition and has illogically deduced from this narrow and circumscribed observation the degeneracy of the whole system.

Dr. Talbot is fond of degeneracy—it is the phase of organic evolution which has apparently impressed him most deeply; indeed, it is difficult to conceive what the result would have been to Dr. Talbot if, under divine providence, degeneracy had been omitted from the evolutional scheme. Certainly there could have been no Talbot as he is now expressed in his voluminous treatment of that evolutional factor. Dr. Talbot is also fond of generalizing from the statistical basis expressed in percentage results, or —as in the instance under consideration and in the absence of figures—by such expressions as "some," "all," "most," etc., as applied to dentists, dental teachers, dental students and dental col-

leges. For example, we find (*Dental Cosmos,* March, 1908, page 236): "Fully fifty per cent of graduates in both medicine and dentistry are failures as practitioners." This may be true or it may be untrue, and even if true as a general proposition considered in relation to the total output of the whole number of educational institutions in medicine and dentistry, it is without meaning and untrue with respect to the educational work of individual schools. Certainly it is a misrepresentation of the facts to say that fifty per cent of the graduates of every school of medicine and of dentistry are failures as practitioners.

Dr. Talbot leaves much to be desired in his reports of observations; mere emphasis and an imposing array of figures are not altogether convincing, and when both figures and statistics approach the miraculous a large margin must be allowed for incredulity in the absence of supporting testimony. He totally ignores the fact that scientific work of considerable amount and importance has already been produced in dentistry by dentists and to the credit of dentistry. His assertions as to the lack of demand for dental books or of an audience of readers for dental periodicals or lack of general interest in scientific research or reports of scientific research upon the part of dentists are not altogether in accordance with the facts. He does not say what books or what kinds of scientific research. We grant at once that a large proportion of dentists are not interested in such matters. We grant also that for their own good they ought to be; but we contend that exactly similar conditions are to be found in the ranks of the medical profession, for they themselves say so. Dr. Talbot in his conclusions fails to take into account the relative differences in numbers as between the dental and medical professions, and especially as to the differences in age and development of the two. He omits all record of the observations which he has presumably made of the educational conditions in dental schools—what schools he has studied and how many he has examined before preparing his general indictment. He makes it appear, by inference at least, that he has examined them all and knows all about them. That he has done this in any such manner as to warrant his statements we have good reason to doubt. Even a "casual" observation should have led to a less drastic condemnation, and at any rate the casual method of observation is open to

some question as to its accuracy and scientific reliability. But Dr. Talbot apparently does not halt at such minor points, and does not hesitate to draw far-reaching conclusions even from the "casual" method. As an earlier example of this same type of generalization we have Dr. Talbot's report of his observations made during a summer trip to Europe in 1897, published in the *International Dental Journal* for January, 1898, in which he gives the detailed results of his examinations of over twelve thousand mouths of inmates of various institutions. In his paper before the First District Dental Society of New York on March 8, 1898, referring to this work, he says: "Every country was visited except Portugal and Lapland," and in the same paper says further: "Standing on the corner of Piccadilly Circus and Regent street, London, I casually examined the faces of the passers-by, and found that, in ten thousand faces, eighty-two per cent had angles beyond the perpendicular." It is not stated by Dr. Talbot what part of his summer vacation trip was spent on the corner of Piccadilly Circus and Regent street, but as he says he examined the faces of ten thousand passers-by and determined that eighty-two per cent had angles beyond the perpendicular, then if he devoted 3.6 minutes to the observation of each case he stood there for two months working ten hours per day with no time allowed for luncheon. Or, if he gave even so brief a time as five seconds to each case, even then he must have occupied his post of observation for eight and one-half days of ten hours each—say from 8 a. m. to 6 p. m. continuously. We are not familiar with any technique of measuring facial angles even "casually" that is capable of accomplishing such large results. Verily a record has been established.

If the data upon which Dr. Talbot bases his diagnosis of degeneracy in dental education have been gathered in the above-described fashion, it is but small wonder that his conclusions are open to question.

Dr. Talbot is in error when he states as a general proposition that the mechanical and commercial ideal is the dominating *motif* in all dental schools, or that "No suggestion is made by teachers in the form of preventive medicine." Dr. Talbot fails to note the fact that in a goodly number of dental schools the teaching in all of the fundamental medical branches is identical

with that given to medical students, and by the same teachers. It is, therefore, not true that no medical teaching is given to dental students, just as it is also untrue that mechanics and commercialism are the dominating motives in dental schools. Dr. Talbot is too sweeping in his generalizations and too hasty in reaching conclusions upon insufficient data. To point a moral or adorn his tale he recites the incident of a university president who said, in the presence of its dean and members of its faculty, while discussing the needs of their dental department: "Your school is nothing more than a school of mechanics." Assuming the quotation to be correct, then one of two things was needed by that university; either a new president or a new dean in its department of dentistry, or possibly both.

Dr. Talbot takes exception to the statement in an editorial in this journal in October of last year, that "The best way to educate a dentist is to teach him the things that a dentist needs to know and do, as broadly and as thoroughly as may be possible—which is the principle in successful operation today in dental education." Concerning which the same editorial contended that this was education on the principle that "A straight line is the shortest distance between two points." Dr. Talbot offers as a substitute for the present system one by which a student may learn enough medicine and enough dentistry in four or five years to be properly entitled to both the medical and dental degrees. Well, frankly, this seems to be rather a shorter line between two points than the three-year line to the dental degree, much too short to connect the points, and not even a straight line at that. It is not straight, because even now it takes all of three years to make a dentist on the principle of the shortest line between two points. Any candid medical educator will admit, even sometimes openly assert, that to attempt to educate a man in four years to the extent which will make him competent to practice in all departments of the healing art is a farce, yet it is just that thing that the medical degree empowers him to do; and to give a man the medical as well as the dental degree in four or five years is, in our view, a much nearer approach to what Dr. Talbot regards as dishonesty on the part of an institution than is the opening of its doors to men who, though in the judgment of the authorities they may not give promise of success, are, notwithstanding, entitled to the right

to try. An honest institution may admit unpromising matriculants, but an honest institution will not graduate the unfit by conferring a medical or dental degree that in such instances is too often little more than a license to kill.

Apart from his tendency to dogmatize and make sweeping generalizations upon insufficient data, we have no real difference with Dr. Talbot other than our exception to his view that a medical degree is the cure-all for the evils which he sees or which may exist in the present scheme of dental education. At its best, dentistry is now coequal, scientifically and otherwise, with the medical specialties, and it has come to be so without a medical degree to cover any of its shortcomings or to artificially push it into its present position. Dentists worthy of their calling are medically educated in all that is fundamental to the healing art, and if Dr. Talbot will examine the situation more carefully he will find that even in dentistry evolution has not wholly expended its forces in degeneracy, and that the law of survival is not to be materialized in a dentist with a medical degree—at least for some time to come. Dr. Talbot's "swan song" was a simile well chosen; the swan song, as he himself states, is a myth.—*Dental Cosmos.*

CEMENTS—THEIR USE IN ORTHODONTIA. By W. V-B. Ames, D.D.S., Chicago, Ill. In presenting the cement subject from the orthodontists' standpoint, I do so without a belief that I can furnish any information specifically beneficial in your application of oxyphosphate cements, and I find at present that I can only treat the subject as it would be of interest to the practitioner in general, except in so far as we need to take cognizance of the fact that your work with cements is almost entirely confined to the setting of bands fitted upon and around the sound teeth, in which condition an amount of expansion is permissible which would be objectionable in the setting of crowns or inlays. For this reason there will be an attempt to make plain the factors accounting for shrinkage and expansion in oxyphosphates. In addition to doing this we must necessarily consider the conditions giving those necessary qualities, adhesiveness and prompt setting in the presence of moisture, without accompanying shrinkage.

Shrinkage and Expansion.—Shrinkage or expansion may occur

in zinc oxyphosphates which crystallize or set to an impervious mass, and does not occur, or rather is never evident, in those in which the setting results in a porous mass. Of the latter class more will be said later.

Shrinkage in zinc oxyphosphate is the result of water being given off in the setting process, because the formula has contained water in excess of the amount necessary for proper crystallization, so that the mass not taking on porosity, it must take on reduced peripheral measurements.

Expansion in zinc oxyphosphate is the result of water being taken up in the setting process, because the formula has not contained sufficient water to furnish the water of crystallization for proper setting, when, if water be accessible, it will be taken into the mass, with the result of increased peripheral measurements. The setting of zinc oxyphosphate in the presence of moisture, with the taking up of a slight quantity of water, as water of crystallization, instead of giving up some of its acid to the surrounding moisture, depends upon the modification of the acid by proper phosphates.

"Hydraulic" Cement Defined.—The term "hydraulic," as ordinarily applied to cements, implies that the ingredients of a certain cement will harden even in the presence of a large excess of water. Since the ordinary industrial hydraulic cement depends upon the admixture of water only for action in hardening, the term as applied to a dental zinc oxyphosphate is apt to be misleading. An absolute, accurately balanced formula would set with neither shrinkage nor expansion and without taking up water of crystallization or without giving off any water. It happens, however, that with some desirable formulæ, this exact balance gives too quick setting, and that a desirable setting quality may be secured by depriving the formula of a slight proportion of water, depending upon the ability of the hardening mass to take up water in the proper quantity for its water of crystallization, without having the balance disturbed at the surface in so doing. It can be reasonably supposed that there is an adjustment of the residual water within, to accommodate the taking up of some at the surface exposed. It will be seen that zinc oxyphosphate needing some additional water for proper crystallization need not necessarily be applied to a visibly moist surface, but that if the slight

quantity of water needed were present, it would be taken care of. Since, however, the giving in this way of just the proportion of water needed would be a risky undertaking, and since water given at the ultimate exposed surface or surfaces answers the requirements, it is more advisable to have the tooth only normally moist, *i. e., not desiccated,* and to depend upon the taking up of water from without for proper crystallization.

This hydraulic property can be embodied only in such formulæ as tend to give rather quick setting, as otherwise there will be a drawing away of the acid upon subjection to moisture, thereby disturbing the proportions of the formula, with the result of a weakened and porous mass to the depth of the disturbance. A formula can contain residual water to the extent of giving off some in the crystallizing process, which will result always in a shrinkage, whereas one being short of water of crystallization will take up the proper quota, if available, with a resulting expansion.

Some cements, conspicuously copper oxyphosphate, which cannot be depended upon to behave properly in the presence of moisture, can be caused to harden so promptly by slight elevation of temperature that they are practically hydraulic, for the reason that they so quickly pass the stage of setting in which they are damaged by moisture.

Adhesion of Cement.—Adhesion of oxyphosphates to surfaces of enamel, dentin, cementum or metal depends upon the density and strength of the granulated surface of the cement; upon the form of granule agglomerated to compose the surface; the condition of the surfaces presented for cementation, and absence of shrinkage. In other words, the strength of adhesion will be in proportion to the strength of favorably shaped granules composing the cement surface, and the irregularity or porosity presented upon the surfaces to be cemented, this being in contradistinction to the adhesion of a gum mastic to a smoother surface. As the cements used are essentially zinc oxyphosphate, we will treat them as if they were that, pure and simple, and speak of the powder as zinc oxid. The strength and density of a cement will depend then upon the powder being a zinc oxid sufficiently basic to give dense vitreous granules, which, when agglomerated by proper basic phosphates, will furnish a mass of greatest strength, and if these dense granules happen to have forms best calculated to knit into the minutest

inequalities of the surfaces presented for cementation, then the maximum adhesion is obtained. In connection with form of granule, it can be said that ordinary zinc oxid as obtained by sublimation of metallic zinc, *i. e.*, so-called zinc white or flowers of zinc, is an amorphous substance. The oxid obtained by precipitation of a zinc salt by an alkaline medium is practically the same, and while the specific gravity of these may be changed by calcination, a true crystal is not obtained, and upon reduction to a fine powder there is a return to an amorphous condition. Zinc oxid in the basic state as obtained by ignition of a salt of zinc may be granular or crystalline, according to conditions, and if properly crystalline, will help constitute a cement giving the maximum of adhesion, for the reason that needle-like extensions of crystals really knit into the minute inequalities or pores of the surface presented for cementation.

We have spoken of the agglomeration of the granules and crystals by a basic phosphate. To help our understanding, we will define zinc oxyphosphate as a mass in which zinc oxid granules are held together or agglomerated by basic zinc phosphate. This basic zinc phosphate is formed after presenting an excess of basic zinc oxid to phosphoric acid or an acid solution of the phosphate of one or more of the metals. I mention this because the nature of the resulting agglomerating basic phosphate depends markedly on the particular metallic phosphate used in the modification of the phosphoric acid. The phosphates of the alkaline metals, for instance, used as modifiers, will give porous friable agglomeration media, while the phosphates of some of the non-alkaline metals and rare earths will give dense, glassy, vitreous, agglomerating media, all of which points bear upon the fact that there is a large possible range of quality in these materials, and that oxyphosphates are not necessarily very similar and, as some suppose, merely solution of glacial phosphoric acid for the liquid and zinc oxid for the powder.

Methods of Mixing Cement.—The mixing of zinc oxyphosphate for the setting of appliances upon teeth for your purposes is an art not acquired without some careful attention to details. To have a desirable plasticity at a proper consistency and satisfactory setting requires a definite procedure, along with a consideration of thermal and hygrometric conditions of the atmosphere and the temperature of the slab upon which the mix is made. I wish at least to call attention to the fact that with a given combination of acid solution

and powder and given humidity and temperature of air and slab, there is the possibility of a very quick setting with granulation, or a mass which will never set, after having made a mix of a given consistency, all this depending on the too rapid or too gradual addition of powder or too little or too much spatulation.—*Items of Interest.*

SERIOUS NERVOUS DISTURBANCES DUE TO TEETH. By E. Ballard Lodge, D.D.S., Cleveland, Ohio. It is well known that very many affections are due to reflex conditions caused by disordered teeth. The trifacial, trigeminus, or fifth pair of nerves, being the great sensory nerve of the face and head, is capable, through its distribution and through its association with other nerves, of producing reflex troubles most far-reaching and serious.

It is further found that there may be profound nervous disorder due to dental irritation with absolutely no dental symptoms, as pain or soreness in or about the teeth, to enable the sufferer to seek appropriate measures for relief.

The second and third divisions of the trifacial nerve, supplying as they do the upper and lower teeth respectively, are in intimate relation with the eye, the ear, the forehead, the scalp, the face, the neck, the shoulder, and even with very remote parts of the body. It is quite needless also to say that it is in close relation with the central nervous organ, the brain. To illustrate some of the pathologic phenomena which can be accounted for by this intricate anatomic mechanism, I will briefly cite a few cases. Dr. J. F. Stephan of Cleveland announces a case of knee trouble, neuralgic in character, cured by treatment of root-canals of bicuspid teeth. The case was of long standing and both knees were affected. Upon the removal of a foul cotton dressing of the lower right first bicuspid the pain subsided in the left knee, and upon treating a septic lower left first bicuspid the neuralgia was relieved in the right knee. The pain was reestablished in the left knee by deliberate closure of the canal of the right bicuspid and again relieved by opening the same. The evidence was thereby assuring, both to the patient and the dentist, that the neuralgia was caused by the teeth. In a recent issue of the British Medical Journal may be seen the report of a case in which neuralgia of the knee was cured by the treatment of a lower tooth. It is said that Dr. Millikin of Cleveland has reported a case of bilateral ulceration of the cornea which was cured by the

extraction of a molar tooth on each side. Dr. J. R. Bell, also of this city, relates an interesting case of epilepsy completely cured by the extraction of impacted lower third molars. Large numbers of cases might be cited which have been recorded in dental and medical literature.

It is difficult to say where dental irritation may not account for trouble.

That grave disturbances of the nervous system, conditions not chiefly or even at all necessarily exhibiting the symptom of pain, may be correctly ascribed to disordered dental states is not doubted.

Not merely neuralgia, in its various forms, may be thus caused, but also epilepsy, chorea, paralysis and insanity are at times the result of dental disease.

The knowledge that dental perversion may account for insanity is not new. If one will turn to page 600 of Burchard's "Dental Pathology and Therapeutics," revised by Inglis, edition of 1904, he will find the following: "Cases of insanity arising from dental diseases have been recorded; they were both maniacal and melancholic. In several of them a restoration to a normal mental state followed promptly upon the removal of the offending teeth. In some of these a preexisting maxillary neuralgia directed attention to the teeth as possible sources of the nervous diseases."

One of the happiest girls in Ohio is one who, a year ago, was a subject fit for a hospital for the insane and who, had it not been for timely dental assistance, would doubtless have been committed to such an institution before this. The patient, a woman of 27 years, was suffering from profound melancholia.

Medical treatment having been of no avail, her physician sought the advice of a dentist to see whether, in the latter's opinion, there might not be dental disease present which could account for the girl's unfortunate condition. The dentist concurred in the view that such might be the case; that it was known that dental lesions sometimes caused insanity. Upon examining the teeth and finding them in apparently good condition, he urged upon the physician the importance of having an X-ray examination made to determine whether or not there was an impacted third molar causing the trouble.

Accordingly a skiagraph was taken and the upper left third molar was found to be in violent impaction with the second molar.

It is appropriate for me now to say that the neurologist in the case, the physician above mentioned, was Dr. Henry S. Upson, and the dentist was Dr. John F. Stephan. The tooth was extracted by the dentist and the patient made a complete recovery, and this within a few weeks after the removal of the tooth and without other treatment. The patient, unmarried and a teacher, had been a sufferer for five years. For a year she had been very restless, terribly depressed and profoundly melancholy. She had intractable insomnia, delusions of having committed many deadly sins and utter hopelessness of recovery.

Melancholia is a disease which may appear in many forms, and it is a disease which may be induced by many causes. May it not be possible that it is brought on by dental irritation much more frequently than has hitherto been supposed? Is it not possible that there are in the world today persons suffering with this or other serious nervous diseases who could be cured if only they had someone enough interested in their case to make the necessary examination of their teeth?

Dr. Upson, encouraged by the fortunate outcome of his case, has been making systematic examinations of the teeth of patients suffering with similar mental diseases in a number of the state hospitals for the insane.

While it is yet too early to expect a report of recoveries in these asylum cases, it is interesting to note the high percentages of impacted teeth, revealed by aid of the X-rays, in the mouths of patients already examined. Of six female patients examined at the Newburg State Hospital for the Insane, the subjects of melancholia, mania and dementia precox, one patient with melancholia and one with dementia precox have unerupted third molars, one undoubtedly impacted.

At the Massillon State Hospital, of nine cases examined, there were six who had impacted third molars. Three of these were suffering with dementia precox and three were manic depressive.

At the Columbus State Hospital for the Insane we examined eighteen patients, of which we found seven with impacted teeth; five of these were patients with dementia precox and two with manic depression.

Among the latter was a young woman, a college graduate and a teacher of German, of whom it was said she pulled out her hair

by the fistful and ate it. A skiagraph of her case revealed an impacted third molar on the upper jaw and on the side from which she pulled out the hair. The appearance of the impacted tooth is identical with that of the patient whose case was cited above, viz., the case of melancholia which was entirely cured by the removal of the offending tooth.

In view of our observations in these cases, it is reasonable, we think, to expect a recovery by the extraction of the impacted teeth. The hospital cases will be watched with great interest, and it is much to be hoped that the recent investigations and examinations with the X-ray will result in great good to these sufferers. While, of course, we can not assign to dental irritation the responsibility of causing all mental disease, still we ought to be ever on the alert to recognize the absence of any teeth, whether third molars or not, as any other tooth may be the cause of irritation as well.

Absolute certainty of the condition can only be determined by the use of the X-ray, and this, too, when the normal complement of thirty-two teeth are present. In these cases there are sometimes found supernumeraries. Only recently I located an upper impacted fourth molar. This tooth was impinging upon the distal side of the third molar and was extracted with a hope of relieving a headache of two years' standing.

In conclusion, I would say that we, as a profession, should be fully aware that our field of usefulness is not curbed within narrow confines. By taking a broad view of the status of the oral cavity in its relation to the health and to disease of the body we cannot but be impressed with the importance of our recognition and correct diagnosis of possible sources of nervous or other disease, remote, perhaps, from disordered teeth, and yet due to dental irritation.

The scope of dentistry is broad and we should study to observe closely that we may be enabled to understand the significance of all abnormal oral conditions. Then we can intelligently advise patients whose cases may not be strictly dental in nature to call upon the neurologist, the oculist or the rhinologist, as suitably befits the case. When we do this, and not till then, may we be truly entitled to the name stomatologist, and only then, in a strict sense, shall we have attained the highest plane as dentist.—*Dental Summary.*

THE MAKING OF AN ALUMINUM PLATE. By Geo. D. Sitherwood, D.D.S., Bloomington, Ill. Take the impression with the best quality of plaster. For the die you may use any method with which you can make a good fit. I prefer the old-fashioned method, making a mold in sand from a plaster model, and using zinc for the die and lead for the counter die. I rarely make more than one lead counter die. With zinc you get just enough shrinkage in the metal to compensate for the expansion of the plaster. Of course you must scrape the impression enough to ease the pressure over the hard palate and also scrape the plaster model enough at the heel so that the plate will fit close across the palatal arch. Where there is much undercut it is often necessary to make some detachable pieces of plaster to form the model so that it can easily be withdrawn from the sand in making the mold. For molding sand a mixture of any two or three good molding sands which the dental supply men furnish is best. The proportion in which to mix them you can best learn by experimenting a little.

Use pure aluminum plate rolled to No. 20 B. and S. gauge. Anneal thoroughly over an alcohol flame or Bunsen burner (spread flame with wire gauze for Bunsen burner), being careful not to overheat, and let it cool gradually or it will become soft like lead and have no elasticity. A manufacturing concern in Germany engaged in making aluminum, states that by long gradual cooling from a red heat aluminum can be made so elastic that it may even be used for hair springs in watches. Sometimes it is desirable to use aluminum plate with a network surface on the upper plate where it comes in contact with the palatal arch. The net-work surface is made by passing the plate through the rollers with a piece of fine ricenet, well starched or sized, and placed on the upper side.

In swaging, always place the plate on the die crosswise from the way it was rolled. Use a horn mallet and smooth pliers, always keeping a piece of thin tissue paper between the plate and die, also between the counter die and plate. The tissue paper is a great aid in keeping the plate clean, as there is always danger of driving small particles of zinc or lead into the texture of the plate. After it is well adjusted to the die, the rim for either upper or lower denture is turned with a pair of smooth bite pliers and beaten down with the mallet or hard wood stock, driving it home in the counter die without any paper.

The plate is then tried in the mouth—it is often better to try in the mouth before turning the rim—and trimmed where necessary to a perfect adaptation. A rim of softened wax is then placed on it and the bite taken. It is then placed on the articulator and the teeth set up, using either gum or plain, according to the operator's choice, attaching the teeth with wax in the same manner as for rubber attachment for a gold plate. For a perfect articulation it is necessary to again try in the mouth. When the teeth are satisfactory, and properly placed, mark with a sharp pointed instrument at the margins of the wax and flask with plaster in a regular vulcanite flask. Separate the flask and remove all of the wax in the usual manner with instruments and boiling water. When the plaster is hard enough pack in the rubber, using the regular plate rubber with pink for facing in front. Place a piece of cloth over the rubber and close the flask with heat, either wet or dry, according to the operator's choice. Remove the flask from the press, separate and see that there is sufficient rubber to occupy all the space from which wax was removed; if not enough, add more; if too much, remove some.

Then carefully remove the plate and place it on the zinc die for etching. Apply on the part to be etched, which is represented between the line marked before the removal of the wax and the turned rim, a little turpentine and sweet oil; this will prevent your chisel from sliding and cause it to cut as readily as if cutting into pure copper.

The etching is made with chisel and hammer, an assistant striking while you hold the plate firmly on the die, and move the chisel as desired. The first row is made with a straight edge chisel about three millimeters wide, turning the handle of the chisel outward; this forms a line of etching that will prevent the thin edge of rubber lifting from the plate; the remaining part is etched in rows around the plate, making each row by leaning the chisel in the opposite direction. A chisel with a bevel edge about five millimeters wide is suitable for this, being careful not to drive the point through the plate. The rim is opened a little so that the rubber will pass under the turned-over portion. After the etching is completed drive the heel up to the die with a piece of hard wood, as the etching process will cause a little lifting of the plate at that point. Then place the plate in a porcelain or china bowl and pour on it about half an ounce of full-strength sulphuric acid, add-

ing four times as much boiling water; in about a minute remove and plunge in a strong solution of sodium bicarbonate, rinsing and brushing in clean water with a little soap. If not bright and clean repeat the process. When dry cover all that portion not etched with a good coat of sandarac varnish. As soon as the varnish is hard replace the plate in the flask and vulcanize an hour and fifteen minutes at 320° F., 95 pounds steam gauge. The sandarac varnish protects the plate, keeping it bright and clean, and is readily removed afterward with a little alcohol. In polishing, the rubber attachment is filed and dressed with scrapers and polished in the usual way, being careful not to cut or scratch the metal portion of the plate. Aluminum will take and retain a very high polish. The best means of burnishing is to use on the lathe a piece of soft wood made in the shape of a cone and soaked in olive oil; this closes the grain of the plate and gives a most brilliant polish.—*Dental Brief.*

Bibliography

DENTAL ORTHOPEDIA—By C. S. Case, M.D., D.D.S., Professor of Dental Orthopedia, Chicago College of Dental Surgery.

There could be nothing more fitting, for an eminent practitioner who has spent the greater portion of his life in the development and advancement of a special branch of dentistry, than to prepare a book in which is illustrated and described all of the various methods by which his own great success has been attained. This is exactly what has been done by Dr. Calvin S. Case in "A Practical Treatise on the Technics and Principles of Dental Orthopedia."

The announcement of the publication of this long-looked-for work will be hailed with delight by the entire dental profession; for every practicing dentist must be interested in the subject matter of this book. Dr. Case has long been considered an authority on every phase of his specialty; and such subjects as "Typical and Atypical Occlusion," "Principles of Occlusion," "The Importance of Preserving the Deciduous and Permanent Teeth," "The Question of Extraction in Orthopedic Dentistry," "Impacted Teeth," etc., are but a few upon which whole chapters are written.

The author states in the preface that "this work is not intended as an unabridged treatise on the principles and practice of Orthopedic Dentistry, but it is one that is especially designed for teaching the technics and practical principles of correcting dental and

dento-facial irregularities in colleges where thorough training is desired. It will also be found convenient and instructive as a reference book in practice.

"In the presentation of the work there has been an endeavor to systematically arrange the different branches in the sequence that would develop in the natural demands of training and practice. It commences with the commercially prepared material and carries the work through the progressive stages to the final construction and adjustment of regulating apparatus and retaining appliances. It deals concisely with general and special principles relative to the application of force, diagnosis, classification, causes, treatment and retention. The description of specific methods of correction commences with simple and complex irregularities that are most common in practice, and progresses through the characteristic types that are susceptible of classification, with a view to a systematic arrangement especially useful in teaching, and also useful to those who contemplate operations of regulating."

The book is divided into six parts, as follows: Part I. Technics of Dental Orthopedia. Part II. Primary Principles of Dental Orthopedia. Part III. Principles of Diagnosis and Treatment. Part IV. Practical Treatment of Simple and Complex Malpositions. Part V. Practical Treatment of Dento-facial Irregularities. Part VI. Principles and Technics of Retention.

The work is published by The C. S. Case Company, 1120 Stewart Bldg., Chicago, and appears in an elegant binding of half morocco, with gilt edges. It contains over 100 drawings of practical regulating apparatus, with every detail for construction; 120 half-tone illustrations, mostly from cases in the author's practice, and about 300 zinc and wood-cut illustrations of appliances, tools, instruments, methods of force, etc.

All things considered, it is one of the neatest books that has ever been offered to the dental profession. In fact, it bears every mark and characteristic of the author, who, throughout the work, has heartily acknowledged a grateful appreciation of the teachings of others, to whom he has given full credit for their efforts in the advancement of this specialty. The book well deserves to be in the hands of every teacher, student and practitioner of dentistry.

J. P. B.

The Dental Digest.

PUBLISHED THE LAST WEEK OF EVERY MONTH

At 2231 Prairie Avenue, Chicago,

Where All Communications Should be Addressed.

Editorial.

SOME COMMON MISTAKES IN DENTAL PRACTICE.

In a previous editorial we called attention to certain mistakes that are being made with the cast gold inlay. Some other mistakes have come to us recently in regard to amalgam fillings. Valuable articles have recently been written on amalgams and methods of manipulation of which we would generally approve. There is, at least, one mistake in the manipulation of amalgam which we wish to comment upon here. It is in regard to the excess of mercury. We believe, as has been advocated, that it is a good plan to use plenty of mercury in the preparation of amalgam for the cavity, but it is a mistake, according to our view, to express the surplus from this mass before placing it in the cavity. It is while the mass is being packed in the cavity that the surplus mercury should be removed by having an extra quantity squeezed out dry and applied to the filling under pressure, especially near the margins, thus absorbing all the free mercury and leaving the margins much stronger than in any other way.

We are emphasizing this point at this time because, to our surprise, we have found among the very best operators that the other method is adopted, i. e., of expressing the excess of mercury from the mass before it is applied to the cavity. A minute discussion of the reasons for our advocacy of this method is hardly necessary here except to say that the more plastic mass applied to the cavity will be easier adapted to all the parts when the mercury is absorbed from it after being in the cavity. We have never used any other method and were therefore surprised to learn of late that the other was generally used.

Another mistake in regard to amalgam is to imagine that any grade is good enough; in other words, it is not unusual for some dental supply men, who have on hand all kinds of amalgams, to dump the slow sellers into one mass, mix them together and sell as junk at a dollar an ounce. It may surprise the careful operator

to know that there is a great demand for such a mass or mixture of worthless amalgams, because it can be bought for a dollar, when the operator is either ignorant of the worthlessness of the mass, which is inexcusable under the present means of acquiring knowledge, or is indifferent to his own and his patients' best interests, and this has a twofold injurious effect. It is injurious to his practice and to his character. Injurious to his practice because such a combination could not possibly be used to make a suitable filling. Injurious to himself and his character because a practitioner that will use worthless material in so important a duty as the filling of the human teeth, knowing that it is defective and will produce poor results, will soon become careless and dishonest in other things and become utterly unfit to practice dentistry. One careless experience such as this leads up to others and this effect on the character of the operator is a greater injury than the poor fillings that are made.

In a foreign city some time ago we happened to run onto this subject and found three different practitioners using three different makes of amalgam, all of them announcing on the back, "Dr. Black's formula." Now, as a matter of fact, Dr. Black has no formula. Dr. Black's valuable work in the line of amalgams was altogether in other directions, yet the supply men usually take advantage of the credulity or ignorance of the practitioner and sell to him an amalgam which we found upon testing to be utterly unfit for use, simply on the ground of having Dr. Black's name on the back of it as being his formula. When it is estimated that the average expense of the amalgam for a given number of filings amounts to less than two cents per filling, it has often been a wonder to us to know that practitioners would buy cheap amalgams, when they could buy those that are absolutely reliable at but a little more expense. In the use of amalgam, as well as in the use of any other material, it is best to follow the motto: "The best is none too good." J. N. C.

FIFTIETH ANNIVERSARY OF THE INDIANA STATE DENTAL SOCIETY.

On June 4, 5 and 6, the Indiana State Dental Society will celebrate, at Indianapolis, its fiftieth anniversary. Every effort is being made to have this meeting one of the most successful dental meet-

ings ever held. Besides a long list of clinicians, there will be four essayists, one from each state bordering on Indiana—Dr. T. W. Brophy from Illinois, Dr. M. H. Fletcher from Ohio, Dr. McFerran Crow from Kentucky and Dr. George Zederbaum from Michigan. Dr. G. V. Black will be the special guest of honor.

The men who have this meeting in charge assure its success and it will be a meeting long to be remembered by all who are able to attend.

Notices.

DUBUQUE (IA.) DISTRICT DENTAL SOCIETY.

At the annual meeting of the Dubuque District Dental Society, held at Oelwein, March 10, 1908, the following officers were elected: President, F. W. Conover, Decorah; Vice-President, D. J. Heisey, Dubuque; Secretary, W. L. Mullan, Dubuque; Treasurer, C. H. Jacobs, Colesburg.

ALUMNI ASSOCIATION, UNIVERSITY OF CALIFORNIA, DENTAL DEPARTMENT.

The Alumni Association, Dental Department of the University of California, will hold its annual clinic on Monday and Tuesday, May 11 and 12th, 1908, at the Affiliated Colleges, Parnassus avenue, San Francisco, Cal. A program of seventy-five excellent clinics with discussion will be presented.

HAROLD L. SEAGER, President, San Francisco, Cal.

ODONTOLOGICAL SOCIETY OF WESTERN PENNSYLVANIA.

At the annual meeting of the Odontological Society of Western Pennsylvania, held at Pittsburg, March 10 and 11, 1908, the following officers were elected: President, A. G. Rinehardt, Pittsburg; Vice-President, J. D. Whitman, Mercer; Secretary, B. M. Loar, Mount Pleasant; Treasurer, J. A. Libbey, Pittsburg.

WISCONSIN STATE BOARD OF DENTAL EXAMINERS.

The next meeting of the Wisconsin State Board of Dental Examiners, for examination of candidates for license to practice dentistry in Wisconsin, will be held Monday, June 15, 1908, at the Wisconsin College of Physicians and Surgeons, Milwaukee, Wis.

Application must be made to the secretary fifteen days before examination. The candidate must be a graduate from a reputable dental college, or have been engaged in the reputable practice of dentistry for four consecutive years, or have been an apprentice to a reputable dentist for five years.

For further particulars apply to

C. S. MCINDOE, Secretary, Rhinelander, Wis.

IOWA BOARD OF DENTAL EXAMINERS.

The Iowa State Board of Dental Examiners will hold its next meeting for examination at Iowa City, June 12, 13, 15, 16, 17, 1908.

Written and practical examination will be required. For further information address E. D. BROWER, Secretary, Le Mars, Iowa.

SEVENTH DISTRICT (N. Y.) DENTAL SOCIETY.

The fortieth annual meeting of the Seventh District Dental Society was held at Rochester, March 31 and April 1, 1908, and the following officers were elected: President, E. G. Link, Rochester; Vice-President, I. C. Edington, Rochester; Recording Secretary, C. W. LaSalle, Rochester; Corresponding Secretary, E. R. Griswold, Dansville; Treasurer, LeRoy Requa, Rochester.

VERMONT BOARD OF DENTAL EXAMINERS.

The next meeting of the Vermont Board of Dental Examiners, for the examination of candidates to practice dentistry, will be held at Montpelier, July 6, 7 and 8, 1908, commencing at 2 o'clock p. m. on the 6th.

Headquarters will be at the Pavilion Hotel.

Application, together with the fee, $25.00, must positively be in the hands of the secretary before July 1st.

Application and other blanks required, including information can be had of J. HOLMES JACKSON, Secretary, Burlington, Vt.

SOUTH DAKOTA STATE BOARD OF DENTAL EXAMINERS.

The next meeting of the South Dakota State Board of Dental Examiners will begin Monday, July 20, 1908, beginning promptly at 9 o'clock, a. m., and continuing three days, at Lead, S. D. All persons desiring to take this examination must make application to the secretary, and send fee of $10 at least one week prior to the above date. No candidates will be received for examination who do not make application as above specified. Applicants are required to bring dental engine, filling materials, articulators, teeth, and all appliances and materials necessary to do crown and bridge work.

G. W. COLLINS, Secretary, Vermillion, S. D.

RESOLUTIONS ON THE DEATH OF DR. W. H. GUESS.

Whereas, God in His infinite wisdom has removed from among the living our friend and brother practitioner Dr. W. H. Guess, of Rogers, Texas, it is therefore

Resolved, That in His death the Central Texas Dental Society and the dental profession have lost an able and earnest associate whose faithfulness for the highest principles of professional life, and sympathetic qualities as a man, endeared him to his colleagues and to all whose privilege it was to know him; and be it further

Resolved: That as a tribute of respect to him a copy of these resolu-

tions be spread on our minutes, and a page in the minute book be set aside to his memory; also that a copy of these resolutions be sent to the dental press, and a copy to the family of the deceased.

Dr. Pitt S. Turner,
Dr. J. M. Murphy,
Committee.

INDIANA STATE BOARD OF DENTAL EXAMINERS.

The next meeting of the Indiana State Board of Dental Examiners will be held in the State House at Indianapolis, beginning at 9 o'clock Monday morning, June 8th, 1908, and continuing three days. All applicants for examinations will be required to be present at this time. For further information address the secretary.

F. R. Henshaw, D.D.S.,
Middletown, Ind.

VIRGINIA STATE DENTAL ASSOCIATION.

The place of meeting of the Virginia State Dental Association, which was previously announced to be held in the Medical College of Virginia, at Richmond, has since been changed and the association will convene instead at Murphy's Hotel Annex. The dates set aside for meeting remain unchanged, viz., July 14, 15, 16, 1908. For further information address,

W. H. Pearson, Secretary, Hampton, Va.

ALUMNI CLINIC WASHINGTON UNIVERSITY DENTAL DEPARTMENT.

Owing to the fact that the Missouri State Dental Association will hold its annual meeting in the city of St. Louis, within one week of the date selected for the holding of the annual Alumni Clinic of Washington University Dental Department, the executive committee have decided to postpone the clinics for this year.

The regular business of the meeting of the Alumni Association will be held on Thursday evening, May 21st, at the college building, corner 27th and Locust streets.

H. R. Faherty, Secretary, 2355 Lafayette avenue, St. Louis, Mo.

FLORIDA STATE BOARD OF DENTAL EXAMINERS.

The annual meeting of the Florida State Board of Dental Examiners for the examination of candidates will be held in Tampa, Fla., May 18, 19, 20, 1908.

Candidates who wish to take examination will report to the secretary, 215 American National Bank building, at 9 o'clock, on the morning of the 18th, and exhibit diploma. Only those who are graduates of reputable dental schools will be admitted to examination.

Candidates must be prepared with instruments to show their skill in operative dentistry, and in the prophylactic treatment of gums and teeth. So

far as possible patients will be furnished. The board in every instance selects cavity to be filled. Each applicant will be required to solder and finish a four-tooth bridge.

The theoretic examination—written—will include operative dentistry, prosthetic dentistry, crown and bridge work, orthdontia, anatomy, physiology, bacteriology, pathology, therapeutics, materia medica, chemistry, oral surgery, histology, metallurgy and oral hygiene.

Candidates must furnish photograph, which will be made a part of secretary's record. W. G. MASON, Secretary, Tampa, Fla.

RESOLUTIONS ON THE DEATH OF DR. FRANK FRENCH.

Whereas; On Friday, March 6, 1908, passed from this life Dr. Frank French, at the age of 73 years.

Dr. French was born at Stafford, N. Y., January 7, 1835. After receiving a common school education he took up the study of civil engineering and was for a time employed as such in Virginia.

He afterward studied dentistry and opened an office for the practice of his profession in 1865.

His quiet, unobtrusive and gentlemanly demeanor gained for him an enviable clientele; this, and the character of his work, which, after many years, reflected the sterling integrity of the quiet, just and unassuming man, secured for him a leading place in his chosen profession.

His patients were steadfast and loyal; and while he had the respect of every member of the dental profession, he possessed a host of friends and admirers outside of his professional life.

Dentistry was his chief interest, and during an active practice of forty-three years he was prominent in all movements looking to its advancement.

He was a charter member of the Seventh District Dental Society, its first president and was elected to the office on two other occasions, serving three terms.

He was a member of the New York State Dental Society, and as the representative of the Seventh District served for thirty-five years as one of the censors of the State Society. During the latter part of his term the title of the office was changed to that of State Examiner, the duties remaining the same.

He was elected secretary of the board and faithfully, long and devotedly served in this capacity, refusing the nomination of president of the State Society.

He was a charter member of this society, and as such we knew him best: faithful in friendship, equitable and just; kind and sympathetic; a wise counselor.

He possessed many lovable traits; a fund of quiet humor and anecdote; a devotion to duty and high ideals, and once he was assured he was in the right, there was no compromise.

We shall miss his hearty greeting, bright smile and hearty hand clasp.

In the language of Ingersoll: "He believed that happiness was the only

good, reason the only torch, justice the only worship, humanity the only religion, and love the only priest. He added to the sum of human joy; and were everyone to whom he did some loving service to bring a blossom to his grave, he would sleep to-night beneath a wilderness of flowers."

He had passed on life's highway the stone that marks the highest point and being weary, lay down by the wayside and, using his burden for a pillow, fell into that dreamless sleep that knows no awakening.

"He fought life's battles as best he knew and without fear passed into silence and pathetic dust." It is therefore

Resolved: That we, the members of the Rochester Dental Society, in session assembled, do record our deep sense of the loss which the dental profession and this society in particular have sustained, and be it further

Resolved: That we extend our heartfelt sympathy to the bereaved family and that these resolutions be spread on the minutes and be published in the dental journals and that copies be sent to the family of our departed member.

Committee { Wm. W. Belcher, Chairman. F. L. Sibley. W. A. White.

STOMATOLOGICAL SECTION, AMERICAN MEDICAL ASSOCIATION.

The annual meeting of the section on Stomatology, American Medical Association, will be held in room Company F, First Regiment Armory, at Chicago, June 2-5, 1908. A highly instructive and interesting program has been prepared, the same being appended herewith:

1. Chairman's Address.....E. A. Bogue, New York City
2. "Dental Education".....M. L. Rhein, New York City
3. "Pathology as Taught in Dental Schools".....
.....L. G. Noel, Nashville, Tenn.
4. "State Reciprocity in Dental Practice Licensing".....
.....Adelbert H. Peck, Chicago
5. "Some Practical Considerations Concerning Inflammation".....
.....James E. Power, Providence, R. I.
6. "Interstitial Gingivitis".....Edward C. Briggs, Boston, Mass.
7. "Prophylaxis of the Mouth".....M. H. Fletcher, Cincinnati, Ohio
8. (a) "Etiology of Face, Nose, Jaw and Tooth Deformities"....
(b) "Bone Pathology of Tooth Movement".....
.....Eugene S. Talbot, Chicago
9. "The Influence on the Nose by Widening the Palatal Arch"....
.....Lee Wallace Dean, Iowa City, Iowa
10. "The Relation Between Deviation of the Nasal Septum and Dental and Jaw Deformities from the Rhinologist's Standpoint".....
.....Nelson M. Black, Milwaukee, Wis.
11. "Diagnostic Value of Microscopical Examinations During Operations on Pathological Tissue".....Vida A. Latham, Chicago

12. "The Surgery of Harelip and Cleft Palate".....
.....George V. I. Brown, Milwaukee, Wis.
13. "Tumors Involving the Alveolar Process".....
.....Stewart L. McCurdy, Pittsburg, Pa.
14. Some of the Diseases of the Salivary Glands and Their Ducts"
.....Thomas L. Gilmer, Chicago
15. "Treatment of Mandibular Fractures".....
.....Robert T. Oliver, West Point, N. Y.
16. "Peripheral Causes of Facial Pains, Including Tic Doloureux"
.....Morris I. Schamberg, New York City
17. "Nitrous Oxid and Oxygen Anesthesia in Dental and General Surgery".....Fred K. Ream, Chicago

All dentists are cordially invited to attend the meeting.

E. A. Bogue, Chairman, New York City.
Eugene S. Talbot, Secretary, Chicago.

NATIONAL DENTAL ASSOCIATION.

The prospects are bright for a most interesting clinic to be held in Boston upon the mornings of July 29th and 30th, 1908.

Returns have been received from invitations sent out for operative, surgical and table work. North, South, East and West will be well represented by able men of the profession who will make the clinic one of the valuable features of the meeting.

The Tufts College Medical and Dental School on Huntington avenue, where the clinics will be given, will afford ample opportunity for all who wish to attend.

The local committee on arrangements will neglect nothing that tends for the comfort and enjoyment of the participating clinicians.

The following gentlemen are acting as state and district chairmen:

Maine, New Hampshire, Vermont—Dr. A. J. Sawyer, Manchester, N. H.

Massachusetts—Dr. G. C. Ainsworth, Boston, Mass.

Rhode Island—Dr. Carl R. Lindstrom, Boston, Mass.

Connecticut—Dr. Ned A. Stanley, New Bedford, Mass.

New York, New Jersey, Delaware—Dr. C. E. Parkhurst, Somerville, Mass.

Pennsylvania—Dr. H. B. McFadden, Philadelphia, Pa.

Maryland, District of Columbia—Dr. Clarence J. Grieves, Baltimore, Md.

Middle Atlantic States, South Atlantic States, Southern Atlantic States—Dr. F. W. Stiff, Richmond, Va.

The chairman has been greatly aided by the secretaries of the various state societies throughout the West in reaching available men for the clinics. He wishes to extend his hearty thanks for their cooperation.

It is no easy matter to arrange a clinic program for a society whose members are so widely scattered, but encouraging reports are being constantly received which foretell a sure success.

George E. Savage, Chairman Clinic Section, Boston, Mass.

INDIANA STATE DENTAL ASSOCIATION.

SEMI-CENTENNIAL JUBILEE MEETING.

The following comprises a partial list of the clinics which will be given at the forthcoming jubilee meeting of the Indiana State Dental Association, convening at Indianapolis, June 4, 5, 6, 1908:

Dr. Truman W. Brophy, Chicago, Ill., "Cleft Palate Operation;" Dr. F. B. Moorhead, Chicago, Ill., "Surgical Clinic;" Dr. J. D. Patterson, Kansas City, Mo., "Pyorrhea;" Dr. E. H. Allen, Freeport, Ill., "Gold Filling;" Dr. C. C. Corbett, Edwardsville, Ill., "Approximal Gold Filling with Cement Lining;" Dr. J. K. Conroy, Belleville, Ill., "Gold Fillings Using Non-Cohesive Gold in Gingival Third;" Dr. William Finn, Cedar Rapids, Iowa, "Gold Filling in Approximo Occlusal Surface of an Upper Bicuspid;" Dr. F. G. Richardson, Mason City, Iowa, "Gold Filling in Approximo Incisal of an Upper Anterior Tooth;" Dr. N. S. Hoff, Ann Arbor, Mich., "Treatment of Pyorrhea;" Dr. J. P. Buckley, Chicago, Ill., "Surgery of, and Drugs Used in Pyorrhea;" Dr. M. H. Fletcher, Cincinnati, Ohio, "Pyorrhea;" Dr. W. F. Lawrenz, St. Louis, Mo., "Gold Inlay;" Dr. W. F. Willard, Anna, Ill., "Gold Inlay;" Dr. F. H. Swartz, Morris, Ill., "Cast Gold Inlay;" Dr. W. H. Taggart, Chicago, Ill., "Cast Inlays and Bridges;" Dr. Louis E. Bake, Chicago, Ill., "Hollow Cast Inlay;" Dr. H. B. Tileston, Louisville, Ky., "Cast Gold Inlay;" Dr. L. A. King, Henderson, Ky., "Cast Gold Inlays;" Dr. Burton Lee Thorpe, St. Louis, Mo., "Gold Inlay;" Dr. L. E. Custer, Dayton, Ohio, "Electrical Casting of Gold Inlay;" Dr. Henry Barnes, Cleveland, Ohio, "Gold Inlay, Using Platinum and Pure Gold;" Dr. F. M. Fulkerson, Sedalia, Mo., "Cast Gold Inlay, Using Hand Pressure;" Dr. L. P. Davis, Lincoln, Neb., "Veneer Gold Inlay;" Dr. Robert Seymour, Philadelphia, Pa., "Cast Gold Inlay;" Dr. Fred H. McIntosh, Bloomington, Ill., "Forming Wax for Cast Gold Work, Investing of Same and Casting;" Dr. Lee K. Stewart, Chicago, Ill., "Gold Inlay from Model;" Dr. George C. McCann, Danville, Ill., "Special Anterior Bridge Abutments and Variations of the Same, for Permanent Splinting of Loose Teeth;" Dr. G. W. Schwartz, Chicago, Ill., "Splint for Loosened Teeth;" Dr. F. E. Roach, Chicago, Ill., "Cast Abutments for Bridge Work;" Dr. W. M. McCall, Louisville, Ky., "Cast Abutments for Bridges;" Dr. Max M. Eble, Louisville, Ky., "Cast Attachments for Bridges;" Dr. H. K. Kellogg, Louisville, Ky., "Cast Attachments for Bridges;" Dr. George Zederbaum, Charlotte, Mich., "Oral Prophylaxis;" Dr. C. E. Bellchamber, Effingham, Ill., "Filling of Ascher's Artificial Enamel;" Dr. C. M. Baldwin, Chicago, Ill., "Ascher's Artificial Enamel;" Dr. Burton Lee Thorpe, St. Louis, Mo., "Translux Enamel Filling;" Dr. H. H. Harrison, Wheeling, W. Va., "Ascher's Artificial Enamel;" Dr. L. H. Arnold, Chicago, Ill., "Making of an All-Carved Porcelain Jacket Crown;" Dr. F. L. Wright, Wheeling, W. Va., "Porcelain Restoration;" Dr. Alden Bush, Columbus, Ohio, "Manipulation of Porcelain;" Dr. A. L. Le Gro, Detroit, Mich., "Labial Porcelain Restoration in Anterior Teeth;" Dr. W. H. Cudworth, Milwaukee, Wis., "Porcelain Restoration;" Dr. C. I. Keely, Hamilton, Ohio, "Cavity Preparation for Gold Inlays;" Dr. Fred W. Gethro,

Chicago, Ill., "Cavity Preparation for Gold Filling;" Dr. Raymond E. Grant, Louisville, Ky., "Preparation of Cavities for Gold Inlays;" Dr. Henry Pirtle, Louisville, Ky., "Combination Fillings, Cement and Amalgam;" Dr. L. P. Bethel, Columbus, Ohio, "Little Helps in Orthodontia;" Dr. C. L. Snyder, Freeport, Ill., "Method of Anchoring Bridges Adapted to Cases Where Lower Incisors Have Been Lost Through Absorption;" Dr. C. J. Lyons, Jackson, Mich., "Porcelain Crowns With Cast Cap and Dowel for Badly Decayed Roots;" Dr. W. G. Bow, Louisville, Ky., "Restoration Badly Broken Down or Fractured Roots With Porcelain Crowns;" Dr. C. E. Byington, Harrisburg, Ill., "A Time-Saving Method in Constructing Shell Crowns;" Dr. Walter Dittmar, Chicago, Ill., "Technique of an Accurate Method for Making Gold Shell Crowns of Proper Contour;" Dr. L. P. Davis, Lincoln, Neb., "Gold Crowns;" Dr. Willis Coston, Topeka, Kan., "Gold and Porcelain Bridgework;" Dr. Harry Lee, Louisville, Ky., "Bridgework;" Dr. H. W. McMillan, Roseville, Ill., "Some Useful Methods;" Dr. E. B. Spalding, Detroit, Mich., "Splint for Teeth When Impossible to Set Posts Parallel;" Dr. William H. De Ford, Des Moines, Iowa, "Instructions in Somnoform Administration;" Dr. George W. Schwartz, Chicago, Ill., "Removable Bridgework;" Dr. J. H. Prothero, Chicago, Ill., "Anatomic Occlusion of Artificial Teeth;" Dr. George H. Wilson, Cleveland, Ohio, "Antagonizing Complete Artificial Dentures;" Dr. E. J. Perry, Chicago, Ill., "Anatomic Occlusion of Artificial Teeth;" Dr. Robert Canine, Louisville, Ky., "Preparation of Cast for Temporary Teeth;" Dr. Walter Dittmar, Chicago, Ill., "Exhibit of Natural Sized Models of Teeth, Tooth Dissections, Drawings and Measurements, Showing the Contour of Normal Shaped Crowns."

Clinic Committee,

E. R. KIBLER, D.D.S.,
Indianapolis, Ind.

LATEST DENTAL PATENTS.

880,277. Tooth brush, O. H. Chandler, Clinton, S. C.
880,328. Combined impression-tray and cheek distender, R. E. Sadler, Cleveland, Ohio.
880,432. Tooth-brush cabinet, G. A. Weidhaas, Jr., New York, N. Y.
880,740. Dental soldering device, A. H. Joy, Newton, Iowa.
880,896. Anchor for contour amalgam fillings, F. W. Linnert, Warrenton, Mo.
880,899. Dental articulator, W. Luxmore, Chicago, Ill.
881,469. Attachment for dental syringes, C. W. Hale, Springfield, Mass.
881,574. Dental-crown swaging machine, L. C. Graham, Whigham, Ga.
881,691. Mandrel for dental engines, H. S. Hughes, Union City, Tenn.
881,722. Dental tool, E. R. Sausser, Philadelphia, Pa.
882,002. Dental swaging device, R. G. Hopkins, Des Moines, Iowa.
882,155. Dental impression tray, W. T. Lyon, Portland, Ore.
882,352. Tooth brush, F. F. Shumer, Norwalk, Ohio.

882,363. Dental instrument, J. T. Wright, Richmond, Va.
882,375. Dental articulator, A. V. Dear, Malvern, Victoria, Australia.
882,404. Dental forceps, W. C. Miner, Boston, Mass.

News Summary.

D. W. MILLS, a dentist of Keokuk, Ia., died March 6, 1908.

A. PORTER RAY, a dentist of Chicago, Ill., died March 22, 1908.

E. FLOYD, 76 years old, a retired dentist of Fayetteville, N. C., died March 3, 1908.

PIERCE T. SMITH, 71 years old, a pioneer dentist of Denver, Colo., died April 7, 1908.

WILLIAM J. WELCH, a dentist of Milford, Mass., died of tuberculosis March 10, 1908.

HARRY F. ROSE, 43 years old, a dentist of Dayton, O., died from pneumonia, March 11, 1908.

WILLIAM D. BAUGHN, 71 years old, a pioneer dentist of Milford, Mich., died March 29, 1908.

WILLIAM H. ANDERSON, a dentist of New York City, was found dead in his office March 11, 1908.

E. M. RICHARDS, 38 years old, a dentist of Thermopolis, Wyo., died from typhoid fever, in March, 1908.

J. ARCHIE KELLER, 22 years old, a dentist of Queretoro, Mexico, died of smallpox early in March, 1908.

WILLIAM T. HARBIN, 59 years old, a dentist of Washington, D. C., died from paralysis, March 28, 1908.

MORGAN R. B. CREERY, 83 years old, a dentist of Ebensburg, Pa., died from paralysis, March 24, 1908.

CHARLES E. STEPHENSON, 29 years old, a dentist of Crawfordsville, Ind., died at Jamestown, April 1, 1908.

WHIT HAMMETT, 65 years old, for many years a dentist of Washington, D. C., died after a short illness, March 27, 1908.

GEORGE W. TINDALL, 76 years old, for fifty-three years a dentist of Kansas City, Mo., died from pneumonia, April 4, 1908.

CHARLES A. BAIRD, 60 years old, a prominent dentist of Youngstown, O., was killed in an elevator accident, March 24, 1908.

ABRAM T. VAN VALKENBURGH, 74 years old, one of the oldest practicing dentists in the state of New York, died at Canastota, March 20, 1908.

MRS. W. T. MAGILL, wife of Dr. W. T. Magill, died at Rock Island, Ill., on Saturday, April 18, 1908. Many of the older members of the Illinois State Dental Society will remember Mrs. Magill's cordial handshake and genial welcome at its former meetings in Rock Island. We extend to the doctor our heartfelt sympathy.

FIRES.—Dr. C. W. Calvert, Atwood, Ill., March 26; loss, $2,500.—Drs. Matthews and Marble, Omaha, Neb., April 2; loss, each $200.—Dr. F. H. Weiland, Redfield, S. D., April 11; loss, complete.

SORE TOOTH KILLS.—Sick with an abscessed tooth, which a dentist advised him not to have pulled, Walter J. Stoddard, 24, a well-known young man of Port Huron, Mich., was found dead in his bed March 26. The coroner says that blood poisoning killed him.

INLAY WAX MODELS FOR CAST GOLD FILLINGS.—After the wax model of the cavity has been removed from the tooth, it can be made smooth by painting with chloroform—the surface will be perfect. This is superior to heat or anything else I have used.—A. W. HARLAN, *Dental Review.*

RHINOLOGIST AND DENTIST.—The nose and throat specialist and the dentist should be the best of friends, for each has knowledge that the other needs, and the cooperation of both is vitally necessary to success in many cases. If there is such a specialist in your town, look him up and make friends. It will do you both good.—*Western Dental Journal.*

ALLOYS AND MERCURY.—If you are buying alloys in large quantities you should reduce the amount of mercury as the alloy gets older. A given alloy which requires seven parts of mercury when it is placed on the market will not require over six parts of mercury if you keep it in your office a year, because the alloy has been a little more annealed.—M. L. WARD, *Dental Review.*

HOLLOW CAST INLAY.—To make a hollow cast inlay, after having the wax model on the sprue, build up the sprue side of wax with the investment and let it harden; then with a small drill in the engine drill out the cavity side of wax to the extent wanted hollow in the inlay and finish the investment. The first investment holds the wax firmly. The drill is better than a lance to cut out the wax.—WILL S. PAYSON, *Castine, Me.*

STERILIZATION OF INSTRUMENTS.—Formerly, I took all the precautions necessary for thorough sterilization by boiling in water and by dry heat in a sterilizer; these extra precautions I found resulted in destroying instruments and did not improve my statistics. I long ago (ten years) returned to cleansing my instruments in diluted alcohol (alcohol ℥i, aquæ distillata ℥iii); after immersing them in this solution for five minutes they are then carefully dried with sterilized gauze.—D. W. GREEN, *M.D., Jour. Amer. Med. Assn.*

LOVING CUP FOR DR. M. W. FOSTER.—In commemoration of his fiftieth anniversary as a dental surgeon Dr. Matthew Whildin Foster, dean of the Baltimore College of Dental Surgery, was presented with a silver loving cup at a banquet at which he was the guest of honor, March 28. The affair was arranged by a number of professional friends, who felt that Dr. Foster's long term of service in the cause of his science deserved recognition. The invitations sent out, while limited in number, were addressed to many states and several foreign countries, for the acquaintance of Dr. Foster is world-wide, and there are many famous men who delight to do him honor. Dr.

Foster is the first dental practitioner in the history of Maryland to celebrate his semicentennial.

FINANCIAL INVESTMENTS.—Freely advertised low-priced mining stock and other like securities, promising large dividends in the near future, are excellent investments for the wealthy, who find their riches burdensome. The prudent dentist, however, making provision for the time when "a grasshopper becomes a burden," will act wisely by giving them the "go by." A saving fund account at three per cent usually proves a more reliable investment.—*Dental Brief.*

ANTISEPTIC SPRAY FOR TEETH AND GUMS.—In cleaning teeth I frequently follow the stick and ribbon floss with the brush wheel used upon the coronal surfaces. After this is all done, I use an antiseptic spray under a pressure of thirty pounds, and go all over the teeth, between them, and especially under the gum margin, to thoroughly wash out any debris that may be left. The spray that I use is echefolta, 1 ounce; dioxogen, 5 ounces, and water, 4 ounces.—J. V. CONZETT, *Dental Review.*

TRUE PROFESSIONAL SUCCESS.—True professional success can be summed up in this one paragraph: To do the best we can for humanity, to let every operation we perform be done as if it were the last we should ever do, and the one by which we would like the world to judge whether we have been successful or not; to regard the financial reward as an entirely secondary matter, to direct our efforts and our lifework toward being a good dentist in the true sense of the word.—H. S. SUTPHEN, *Items of Interest.*

REGULATE THE DIET.—The more complete becomes our knowledge of physiological and pathological law the more manifest becomes the truth that a large proportion of human ailments are directly or indirectly dependent upon nutritional perversions, and that the proper regulation of the dietary must be accepted as the best hope of preventive medicine, as well as of preventive dentistry, and, rather than drug-giving, must be regarded as the fundamental basis of all rational therapeutics.—EDITORIAL, *Dental Brief.*

A DENTIST'S EARNING CAPACITY.—A dentist's earning capacity, if a successful and progressive practitioner, should increase as he gains experience and expertness. This does not come from larger fees alone. Ability to do more in a given time; being able to decide quickly what to do and how to do it; less time wasted in unprofitable experiments, and so managing one's patients as to be kept fully employed during office hours, are far more important factors in increasing one's earning capacity than increased fees.—CHAS. F. BONSALL, Philadelphia, Pa., *Dental Brief.*

CARE IN EXTENSIVE OPERATIONS IN RELATION TO AGE OF PATIENT.—Extensive operations, particularly in orthodontia, have been done on girls at the age of puberty and these conditions should be considered very seriously. I am satisfied in my own mind that much harm has been done and is being done. There is also a time, say from forty to forty-five or fifty, when operations on women in the midst of change of life, should be done with the greatest judgment. Teeth should not be extracted at certain times during

this period. I can recall several cases in my own practice where the best results were not obtained by removing teeth at that time of life.—J. E. HINKINS, *Dental Review.*

PREVENTING HEMORRHAGE IN PRESSURE ANESTHESIA.—The adrenalin chlorid has been suggested as a means of preventing hemorrhage. Now, it ought to be evident to anyone who has studied this subject that to prevent hemorrhage by the use of any hemostatic agent, it is necessary to force the agent into the tissue from which the hemorrhage proceeds. Therefore, to get the effect of the adrenalin chlorid in removing pulps by anesthetization, it is absolutely essential that the anesthetizing solution, which also contains the hemostatic agent, be forced through the apex and into the apical area—the very thing we have been taught, from sad experience, not to do.—J. P. BUCKLEY, *Dental Brief.*

SOMETHING TO REMEMBER.—As the three-leaved or poison-ivy vine is so common, and ivy poisoning so severe, I want to tell my dental friends what I have found an efficient remedy: If you are poisoned by ivy poison, use a paste made from wood ashes and water, when effects of the poison first appear, rubbed on the part. In later stages use peroxid of hydrogen, 3 per cent, as it will be more agreeable to the skin in this condition. The writer has cured himself repeatedly in the first stages by wetting a finger with water and touching wood ashes, rubbing the paste well into the skin. The itching is allayed at once and the poison neutralized and made a harmless substance to the skin.—L. W. JORDAN, *Dental Summary.*

ETHICS.—We should aim to raise those within our ranks to the highest appreciation of the true ethical relations which should exist in professional life, and we can do this more by example and in our daily intercourse, one with the other, and with the public, than by any other means. Let those who have the welfare of the profession at heart live such lives of probity and equity that the doubtful ones will irresistibly be drawn into a higher atmosphere of professional purity. Above all, let our society members live up to the true spirit of the code to the end that the frequent contentions over violations of the letter of the code shall cease to be a factor in the conduct of our professional organizations.—C. N. JOHNSON, *Dental Review.*

ALL IS NOT GOLD THAT GLITTERS; TREAT CHARITY PATIENTS WITH CONSIDERATION.—I know a surgeon whose name will doubtless be inscribed upon the roll of honor, and I am familiar with some parts of his life, and I know I do not care to reach that kind of success if I must travel through the channels along which he goes. I know of a case where he refused to operate because the patient was too poor to pay him. He holds a pair of scales with the life of the patient on one side and gold on the other, and if the gold is not put in heavily enough the scales will go down upon the other side. Now suppose a young professional man took that man as his beacon and did not familiarize himself with his life, then, unless he thinks for himself, he does not know what true success means. Let us take a more striking example; take for instance the life of Carlyle.

I feel that no man should read Carlyle's writing, the great wisdom that is expressed with his words, until he has familiarized himself with Carlyle's life. It seems to me there was not a thing in his life that would not tend to make of him a pessimist, and still he was an optimist.—J. E. POWER, *Items of Interest.*

ARRANGEMENT OF ARTIFICIAL TEETH.—Artificial teeth, as they come to us from the manufacturer, are beautiful duplications of the forms and likeness of unworn natural teeth, and selections can be made that will fulfil all the requirements so far as looks are concerned. Such teeth can be arranged upon casts so as to simulate labially, lingually, bucally and proximally almost any type of restoration desired. Occlusally the bicuspids and molars if arranged without any change or modification of form, can result only in the coming together of surfaces pointed or rounded, or both—small in area, few in number—and are, therefore, deficient in reducing power, the grinding force being essentially, if not altogether, eliminated.—T. W. PRITCHETT, *Dental Review.*

TRIGEMINAL NEURALGIA.—Wright has extended the injection of nerves with osmic acid to the injection of the Gasserian ganglion itself. The patient was anesthetized, and an incision made from above the zygoma downward and curving forward along the lower border of the jaw. The zygoma was resected and turned down and the coronoid process was divided and turned up. The inferior dental and lingual nerves were found and traced up to the foramen. By means of a curved dental syringe a few drops of a 2 per cent osmic acid solution were injected into the ganglion through the foramen. The nerves were then torn away and the wound closed. The results were fairly satisfactory in the first case and very satisfactory in the second.—*Jour. Amer. Med. Assn.*

EXAMINING BOARD AFFAIRS.—Governor Gooding of Idaho has reappointed Dr. E. L. Burns of Boise as a member of the State Dental Board. The appointment is for three years.—Governor Crothers of Maryland has reappointed Dr. Harry A. Wilson of Baltimore, and also named Dr. T. B. Moore of Cecil county, on the State Board of Dental Examiners. Dr. Moore will succeed Dr. William T. Kelly of Easton.—At the March meeting of the Massachusetts Board seventeen out of seventy candidates were successful in passing the examination.—The Hawkins bill providing for the appointment of a Dental Board was signed by Governor Harris of Ohio, April 7, and the following board under the new law announced: H. C. Brown and F. R. Chapman, Columbus; F. H. Lyder, Akron; L. L. Yonker, Bowling Green, and W. D. Tremper, Portsmouth. The only member of the old board reappointed was H. C. Brown, who was appointed for the short term, one year.—The Governor of Oregon has appointed Dr. A. M. Essen of The Dalles a member of the State Dental Board to succeed Dr. L. Bundy of Medford. The appointment is for three years.—Governor Cutler of Utah has reappointed Drs. A. C. Wherry and S. H. Clawson, members of the State Dental Board. —A bill has been introduced into the Legislature of British Columbia, by the Attorney-General, which provides for the organization of a College of

Dental Surgeons in the Province. All members of the profession authorized to practice in the Province are to be members of the College. The first council is to be composed of the Board of Examiners now provided for by statute.—The newly appointed Board of Dental Examiners for the State of Mississippi consists of P. H. Wright, Oxford; L. B. McLaurin, Natchez; A. B. Kelly, Yazoo City; C. T. Shumaker, Poplarville; E. Douglas Hood, Tupelo. The last named is secretary of the board. All are members of the State Dental Association.

MARRIAGES.—Truman W. Brophy, a dentist of Chicago, was married to Mrs. Esther Strawbridge of Moorstown, N. J., March 31.—Thomas Reid, a dentist of Chicago, was married to Mrs. Margaret A. Kerdolff, also of Chicago, April 11.—Herman Levin, a dentist of Hartford, Conn., was married to Miss Rebecca Kosinsky of New Haven, March 29.—Charles W. Peterson, a dentist of Moline, Ill., was married to Miss Rose Roberge of Rock Island, April 6.—T. B. Hollenbeck, a dentist of Boone, Ia., was married to Miss Della Haislet of Minneapolis, March 23.—C. C. Cunningham, a dentist of Boston, Mass., was married to Miss Annie Donahue of South Boston, March 18.—William G. Coffey, a dentist of Wheaton, Ill., was married to Miss Estella L. Binder, February 14.

DENTISTS FOR THE NAVY.—The "teeth of the navy" was a subject under consideration by the House committee on naval affairs, March 12. Bills introduced by Representatives Butler of Pennsylvania and Wiley of Alabama to authorize the appointment by the President of dental surgeons in the navy were up for hearing. The bills provide for the appointment of not more than thirty dentists, graduates of the standard dental colleges, trained in the several branches of dentistry, within the age limits of twenty-one and thirty-five years and of good moral character and professional standing; their appointments to be for a term of years and revocable at the pleasure of the President. The Butler bill has the endorsement of the Navy Department.

THE CARE OF IMPRESSION TRAYS.—Probably no dentist would intentionally place a dirty impression tray in a patient's mouth, but many clean trays are dirty looking to the patient on account of the dulled and scratched condition of the trays. Where modeling compound has adhered to the tray from overheating, it is a common practice to scrape away the remains of the compound with a knife or other sharp instrument. This invariably scratches and grooves the metal tray, giving it an old appearance and making it unfit for use of plaster, especially where it is necessary to remove the tray from impression before removing impression from the teeth. Trays can be kept free from scratches and bright if the dentist will adopt the following procedure: When modeling compound adheres to a tray, do not use a knife or any instrument for scraping. Simply boil the tray in water (add a little soda if you prefer), wipe as clean as possible with a soft cloth, then pour a little alcohol into the tray, and with thumb or fingers rub it over the remaining compound. Being a solvent of the modeling compound, it removes every particle and leaves the tray as bright and smooth as new.

If trays become dulled from age, take them to your lathe and go over them with a stiff brush wheel and fine pumice stone, polishing with a soft brush wheel and prepared chalk. Your patients will appreciate clean trays and they will notice them, too.—L. P. BETHEL, *Dental Summary.*

SPLINTING TEETH LOOSENED BY PYORRHEA WITH THE AID OF GOLD INLAYS.—In cases where the teeth have become loosened by the ravages of pyorrhea or by mechanical injuries, an excellent use can be made of gold inlays. Two or more teeth can be held firmly in place by an appliance made of two or more inlays soldered together and cemented in place. Cases where two teeth have become separated, allowing a space where food may lodge and cause an inflammatory and diseased condition of the tissues—which, as we all so well know, is the source of a great deal of trouble—can be corrected very satisfactorily by the use of two gold inlays, set mesiodistally and united or soldered at the occlusal angle, thereby retaining the two teeth in place, preventing the space from becoming larger, and closing it from any further wedging of food.—E. M. S. FERNANDEZ, *Dental Review.*

ADENOID VEGETATIONS AND TUBERCULOSIS.—Roux and Roques report in the *Revue Mensuelle d. Mal. de l'Enfance,* for October, 48 cases of tuberculosis in young children with adenoid vegetations, out of a much larger number which they have encountered. All the children had enterocolitis, and Roux and Roques have previously published arguments to sustain their view that adenoiditis almost always precedes infantile intestinal disease. They believe that inflammation in the rhinopharynx is always the first reaction to invasion by the tubercle bacillus; it is the first manifestation of the defense on the part of the organism. They advise, in studying the subject, that adenoid vegetations from infants between 4 and 10 months old should be selected for inoculation, and that the animals inoculated should be less than 15 days old (guinea-pigs 8 to 10 and rabbits 10 to 15 days old).—*Journal Amer. Med. Assn.*

ILLEGAL PRACTITIONERS.—A dentist of Oakland, Cal., arrested and convicted for practicing dentistry without a license, March 9, petitioned for a writ of habeas corpus, which has been denied him. He attacked the constitutionality of the law and alleged that his commitment was illegal. He was remanded to the city jail.—A barber of Chicago was arrested March 18, charged with practicing dentistry without a license, and was released on giving bonds for his appearance.—A woman, proprietor of a dental office in Boston, was arrested, April 3, on the charge of practicing without a license. She is the first woman to be prosecuted under the law governing such offenses in Massachusetts. She pleaded not guilty and claimed that all the work in her office was done by a registered dentist whom she employed. The case has been continued.—Three dentists of Boston were fined $50 each, March 25, for practicing dentistry without a license.—A dentist of Portland, Ore., was sentenced March 21 to pay a fine of $125 and pass ten days in the county jail for practicing dentistry without a permit. He

was convicted once before for practicing in violaton of the state law, and asserts he is a victim of the state board.—A dentist of Provo, Utah, was sentenced March 15, to pay a fine of $100 on a conviction of practicing dentistry without a license. Notice of appeal to the supreme court was immediately filed and the appeal perfected on a bond of $250.

How to Regulate Fees.—How to regulate one's fees is a subject well considered by Dr. J. B. Roberts (*Jour. A. M. A.*). The physician should have fixed in his mind an estimate of the value of his services, operative or otherwise. The amount should be based on his experience and skill. It should not be so low as to coax away unfairly the patients of his younger and less experienced colleagues. The fee should be lessened when the patient's income would be seriously depleted by its payment. A well-to-do patient should pay the full fee, which should be generous in order to recompense the physician for his expensive education and hazardous life. This fee, however, should not be increased because the physician's services are utilized by a very wealthy person, unless an unusual time is given to the service or an additional responsibility is placed on the physician by reason of the man's position.—*Medical Times.*

Patient Biting Dentist's Hand Results in Blood Poisoning.—Dr. A. O. Martel, one of the leading dentists of Lewiston, Me., lies seriously ill of blood poisoning, as the result of having been accidentally bitten by a patient upon whose teeth he was working. It is understood that the doctor had administered gas to the patient and was removing the apparatus from over the mouth when the patient's teeth suddenly came together and caught a portion of Dr. Martel's hand, breaking the skin. Blood oozed from the wound, which was not at all serious, and nothing further was thought of the accident until a few days later, when the hand began to swell. A physician was summoned and an examination revealed that Dr. Martel was suffering from a severe case of blood poisoning caused by the bite. Physicians have been unable to relieve the dentist, who has grown rapidly worse until now his condition is considered very critical.—*Portland Express.*

Dangers to Which the Eyes of the Dental Operator Are Exposed and Certain Precautions to Be Observed.—The author calls attention to the sources of infection and traumatism to which the eyes of the dentist are continually exposed. He cites two recent cases in which the consequences of the accidents assumed unusually serious proportions. One of these cases was that of an operator who was struck in the eye by a piece of tooth substance in the course of an extraction; the other was due to a similar mishap in which the piece perforated the cornea and resulted in the loss of sight in the injured eye. But even apart from such palpable traumatism the eyes are constantly exposed to septic matter from the mouth of the patient, particularly if it be remembered that the conjunctiva possesses strong absorbing power.

If at all possible, it would be advisable, says the writer, for the dentist to protect his eyes by means of suitable glasses and to keep his head at a distance of not less than twelve inches from the mouth of the patient.

When, after a long operation, eye-strain is felt, the author recommends applying cold water upon the eyes while they are kept closed.—Dr. Senn, Zurich, *Dental Cosmos.*

Robberies.—The office of Dr. James M. Thomas, Chicago, Ill., was entered March 13 and gold and instruments valued at $500 were taken.—Dr. Wm. G. Cummins, Chicago, lost gold and instruments valued at $100, April 8.—Dr. F. R. Carson, South Bend, Ind., gold and material valued at $25, March 12.—Drs. Harper & Brister, Gulfport, Miss., gold foil, crowns and platinum valued at $80, March 8.—Dr. J. Homer Williams, Kansas City, Mo., gold crowns valued at $150, April 8.—Drs. D. W. and J. F. Rulison, Reno, Nev., gold plate, teeth and silver valued at $200, March 22.—Dr. C. W. Cuthbertson, Washington, D. C., gold plate and fillings valued at $120, March 13.—Dr. Gilmer, Denison, Tex., gold fillings valued at $80, March 12.—Dr. Henley, Marshall, Tex., gold and platinum valued at $50, March 21.—Drs. C. B. Holmes and J. P. Arnold, Galveston, Tex., gold and instruments valued at between $100 and $150, March 29.—Dr. F. G. Stevens, Lancaster, Pa., teeth valued at $200, March 30.

Investing the Wax Inlay.—The best time to invest wax inlay is the moment you take it out of the patient's mouth. If that is not done, and it is allowed to remain in a bottle or on a shelf, on a hot day its own weight might distort it a little. Always write the patient's name on the flask so as to distinguish one from another. Investing material and plaster of Paris have a great deal of contained air in them and that contained air is not necessarily fatal but is very undesirable, and the efforts to jar out the resulting bubble only seem to bring up another bubble, and that would cling to the wax inlay. I use a tiny spatula for carrying the investment, and putting a little of the investing material on the wax *where you do not want it, and carefully pushing it ahead to where you do want it,* so as to prevent any air getting in ahead of you, bubbles will not be formed. When the wax is entirely surrounded I commence at the base to build up, and from this time on I never like to jar it.—W. H. Taggart, *Items of Interest.*

When "Patent Medicines," Etc., Are Intoxicating Liquors.—The Court of Appeals of Georgia holds, in Mason vs. State, that medicinal, toilet and culinary preparations, recognized as such by standard authority (such as the United States Dispensatory) and not reasonably capable of use as intoxicating beverages—e. g., tincture of gentian, paregoric, bay rum, cologne, essence of lemon, wood alcohol—are not ordinarily to be regarded as being within the meaning of the expression "intoxicating liquors," though such articles are liqiud, contain alcohol, and may produce intoxication.

But "patent medicines," cordials, bitters, tonics and other articles not recognized by standard authority as being within the class just mentioned are to be regarded as being intoxicating liquors, if they are capable of being used as a beverage and contain such a percentage of alcohol as that, if drunk to excess, they will produce intoxication.

The expression of "intoxicating liquors," as used in statutes, in the ab-

sence of other words tending to limit the meaning, may be defined as including any liquid intended for use as a beverage or capable of being so used containing alcohol obtained either by fermentation or distillation, or both, in such a proportion that it will produce intoxication when taken in such quantities as may practically be drunk.—*Jour. Amer. Med. Assn.*

THE EVILS OF QUACK MEDICAL ADVERTISEMENTS.—If all the injury done to humanity directly and indirectly by quack medical advertisements were to be answered for by the orthodox fire and brimstone, there wouldn't be fuel enough in the universe to supply the demand. More sickness has been developed by reading this trash than has ever been cured by the so-called remedies it advertises, and more money has been squandered by the people in buying the worse than useless concoctions thus exploited than would have paid the national debt many times over or built homes from one end of the land to the other for the aged and helpless. It is positive evil which has planted its poison in the public mind for so many years and to such an extent that the wonder is that legislation has not long ago been passed to suppress it. It is a crying shame on our civilization that an evil of such vast proportions and so far-reaching in its effects should be allowed to menace the public health as this has done for so many years. Quackery of all kinds is bad, but the quackery which continually fosters disease without curing it is a positive crime.—C. N. JOHNSON, *Dental Review.*

USE OF PERFUMED VASELIN.—There are so many revenues a dentist can draw by investing a few cents in the cost of a jar of perfumed vaselin that it would, perhaps, be useless for me to mention them, since every careful dentist has one on his bracket table.

With few exceptions, we encounter not infrequently cases where a crown or bridge is indicated and where the adjacent root carries, probably, a telescope or a dowel crown. In such a case you are confronted with a serious proposition if not careful in paying attention to the details incident to taking the impression.

You will avoid trouble by lightly coating the surfaces of the adjacent artificial tooth, labially or buccally and lingually, with perfumed vaselin previous to taking the plaster impression. And you may prop the upper and lower jaws with any suitable device, just enough so that the patient's tongue may not conflict in washing the vaselin away from around the tooth. For this purpose, a medium-size cork will answer the purpose eminently well.

The certainty and facility with which you can remove such impressions will more than repay the strict adherence to this detail.

Be sure to apply the vaselin before you take the impression. I know some of us may be in a hurry, the plaster hardens or nearly so while we are mixing it in the bowl, and thus we forget the most important part.

If the first impression is defective, you can remedy by taking as many as you wish until a perfect one is obtained, but if you have carelessly forgotten to lubricate the surfaces referred to, you may then have a dislocated crown to deal with. Even though it seems in place and the distortion may be in-

finitesimal it may give rise at some future time to an unpleasant interview with that patient.—B. BRAMM, *Chicago.*

WHERE GOLD INLAYS ARE INDICATED.—Gold inlays are indicated in large cavities, particularly in molars and bicuspids and distal surfaces of cuspids, especially the upper left, and in the incisors, where there is frail enamel and heavy occlusion, step anchorage impossible or teeth much worn. They are especially indicated in the teeth of young girls and restless patients, and the only filling possible for the bicuspids of some young girls whose teeth have approximal cavities at fourteen to eighteen. In such cases amalgam is out of the question, gold foil is impossible, cement is ruin and gutta-percha is forced out by mastication. We have all seen attempts to save such teeth with amalgam. In a few years they are black and must be crowned. Such teeth plastered up with cement ruin the whole articulation, because contacts are never retained, the teeth fall together, and are so narrow mesiodistally at twenty years of age that gold filling is impossible. Inlays are the dentist's sheet-anchor and the patient's comfort on all surfaces of the teeth where partial dentures rub. Gold inlays are not indicated in small cavities because gold foil can be inserted more easily. Nor is it wise to attempt their insertion in approximoocclusal cavities in belt-crowned teeth or thick-necked teeth, because so much of the occlusal surface of the tooth would have to be cut away to allow the matrix to draw.—A. E. WEBSTER, *Dominion Dental Journal.*

RED MEAT AND WHITE MEAT.—Is there any difference between the food values of red and white meats? It used to be supposed that white meat was harmless in cases where red meat might be injurious, and that in general the red is much heartier food than the white. Largely as the result of the work of Offer and Rosenquist, published in 1899, this current view was modified, and it came to be generally accepted that from the analytic standpoint at least there was but little distinction. This belief, we are told by a writer in *The Medical Record* (New York, March 21), has not been entirely in accord with the experience of those accustomed to treat such diseases as gout and nephritis. Says this paper: "It has been pointed out that while Offer and Rosenquist's observations showed that as far a raw meat was concerned, the difference between the amounts of nitrogenous extractives and bases in the red and white varieties were so slight as to be practically negligible, it remained to be demonstrated that the process of cooking and the manner in which this was done did not alter the conditions. This question has been taken up by Adler, who presents the records of analyses of numerous meats both in the raw and cooked condition. While his results on raw meats correspond closely with those of the previous investigators, he found on comparing veal and beef that both frying and boiling caused the extractives of the former to be reduced to about one-fifth of their raw amounts, while with the beef the difference was unimportant. Analyses of other meats gave similar results, and he concludes that in the cooked condition there is a sufficient difference between extractive content of red and white meats, particularly beef and veal, to justify a distinction be-

tween the two. Cooking therefore seems to cause white meats to lose more of their extractives than is the case with red, and taking for granted a deleterious property on the part of the nitrogenous extractives, the clinical observation that in certain maladies red meats are injurious finds analytic confirmation."—*Literary Digest.*

[The above will interest those who hold that certain types of pyorrhea are associated with gout and rheumatism.—EDITOR, DENTAL DIGEST.]

CONCLUSIONS IN REGARD TO SILVER NITRATE.—(1) It is thoroughly self-limiting in its action, which quality prevents it from penetrating beyond the outermost layers of dentin—Dr. Truman's conclusions to the contrary notwithstanding. Deep, soft dentin in a cavity continued to decay under the blackest layer of superficial dentin which had been saturated every four months for several years, with 40 per cent silver nitrate solution.

The only advantage resulting from its use is that the process of decay is slower than when the silver nitrate is not used, but the apparent integrity of the covering of discolored dentin leads the operator into a false sense of safety, while the decay goes on beneath.

(2) When applied to superficial hard decay, the benefits are very marked, although if there be retention of fermentable substances its effects are very transient. Therefore, whenever the position of the cavity is favorable to the production of caries, and perfect cleanliness be not possible, no reliance should be placed on silver nitrate to permanently arrest the process of decay; our hopes in this direction have sadly failed to materialize.

(3) Applied to what we, the unconverted ones ,call "soft" or "frail" teeth, silver nitrate has had in my hands very decided beneficial effects on the structure of these weak teeth, and also in warding off the action of such acid substances as may be present in the fluids of the oral cavity. However, the good effect gained in these cases is counterbalanced by the staining and discoloration of these teeth, which in intensity is in direct ratio to the beneficial results of its action.

(4) Its effects on erosion are decidedly beneficial in arresting the eroding process, and from my long study of the action of the drug I am persuaded that its effect is accomplished through deposition of silver salts in the superficial layers of the dentin, which arrests the action of the erosive fluids on the surface of the teeth, and not through any effect on the structure of the tooth itself. The layer of silver salts protects the surfaces to which it is applied in the presence of superficial semi-soft decalp; but too much reliance must not be placed on it to arrest the deeper form of decay, or to stimulate a deposit of secondary dentin, or to strengthen the dentin by stimulating the odontoblasts to deposit calcium salts in the tubuli, to barricade the way, as it were, to the destructive bacteria which penetrate them (*vide* Miller), as I had been led to believe after my first years of clinical study of the action of silver nitrate.

(5) Silver nitrate is an invaluable adjunct in preventive dentistry, when used in certain obscure cavities of difficult access before the insertion of

fillings, especially metal fillings; that is, if due precaution be taken to thoroughly wash out or neutralize any free nitric acid in the silver salt. Much of the ill effects resulting from the use of silver nitrate arises from failing to neutralize this powerfully destructive acid. It is particularly destructive to the margins and substance of amalgam fillings when the proportion of silver in them is large.—Dr. L. C. Bryan, *Dental Cosmos.*

Cases of Inflammations of the Throat of Dental Origin.—A woman of twenty years had been referred by her family physician to ascertain whether the condition of her teeth could be in any way responsible for the nine attacks of tonsilitis from which she had suffered during that year. The examination of the mouth showed the gum tumefied around the necks of the teeth, and the left third molar badly decayed and with infected root-canals. In addition, the masticating and distal surfaces of that tooth had broken down and a portion of the gingival mucous membrane was lying within the carious cavity. The gum around this tooth seemed deeply inflamed, likewise the mucous tissue of the anterior pillar and the tonsil of the same side. The uvula, soft palate and right tonsil were also swollen. There was dysphagia and the breath was offensive. The left third molar was extracted, the dentin was scaled and polished, and the gum suitably treated. The patient was seen some time afterward and reported that the tonsilitis had not recurred. Three months later, however, she suffered from another attack caused by caries of the right third molar with involvement of the pulp. There was edema of the cheek and a slight trismus. Proper treatment of the root-canals and filling of the cavity was followed by the disappearance of the trouble.

In addition, it should be noted that tonsilitis may likewise be induced by the pathologic eruption of the third molar. The following case serves to illustrate such an occurrence:

This was the case of a woman, aged twenty-four, in whom the inflammation of the flap of the mucous membrane covering almost the entire crown of the third molar had spread to the uvula, soft palate and tonsils. There was dysphagia and the tonsils were covered with a pultaceous exudate. The inflamed tissues eventually became edematous, there was severe pain on swallowing, fever, body-aches and submaxillary adenitis. The case was diagnosed as one of phlegmonous inflammation of the throat. The right tonsil was more severely affected than any of the adjacent structures. The treatment which was instituted in conjunction with the attending physician consisted in the administration of ipecac in doses of gr. v each. After the second dose the efforts to vomit caused the abscess of the right tonsil to break, which at once relieved the patient markedly. An antiseptic treatment of the mouth followed during fifteen days, together with the administration of efficient tonics, and the eradication of the pus-pocket by means of the thermocautery brought about complete recovery.

In this case it is almost certain that the phlegmonous tonsilitis would have recurred if the condition around the third molar had been allowed to remain undisturbed.—F. Lemaire, *Dental Cosmos.*